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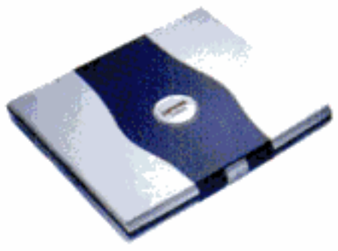

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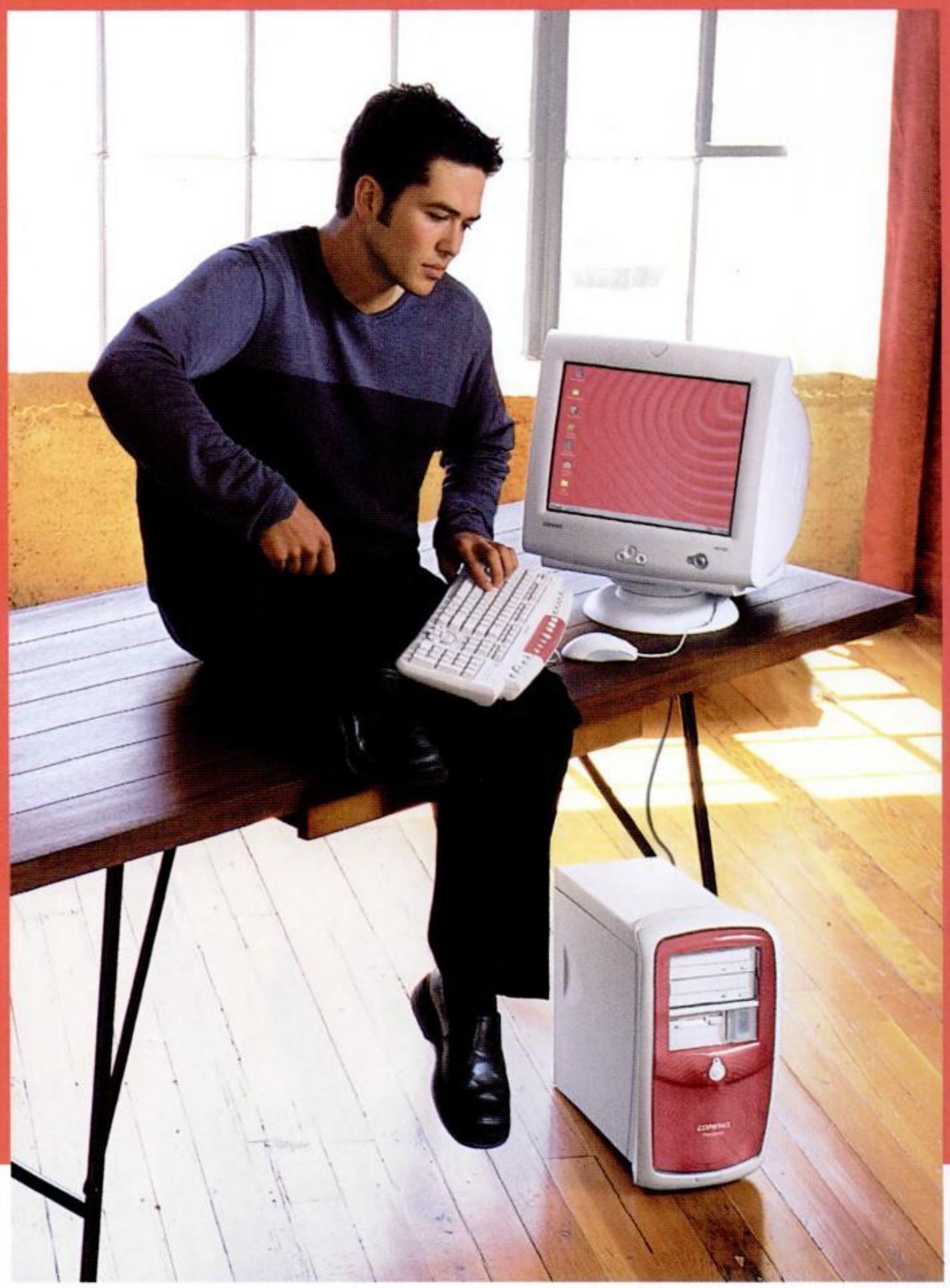

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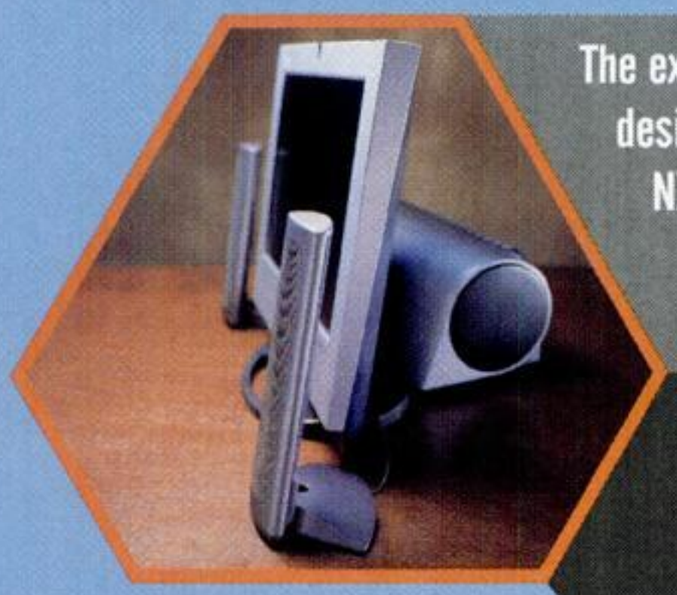

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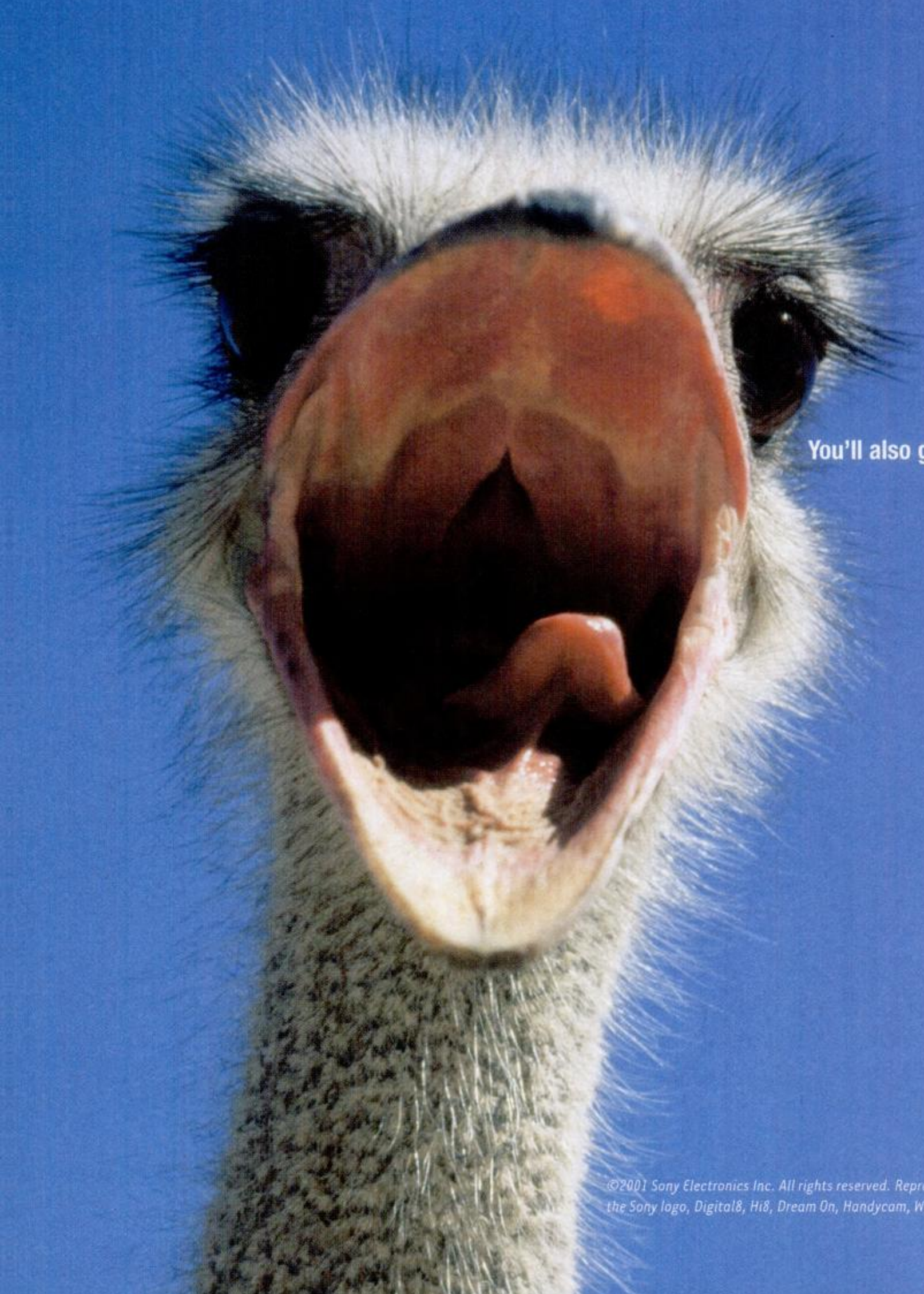

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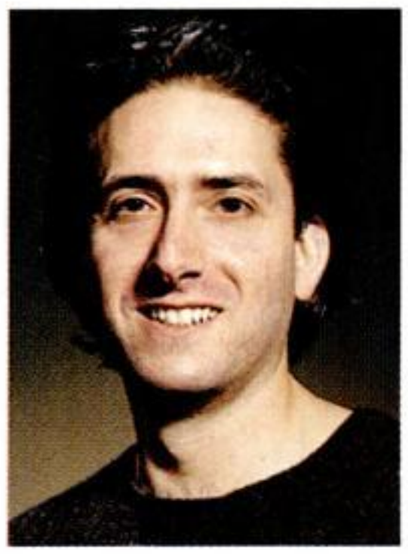

Your 3-Point Plan for 2002

Two-thousand one was a banner year for *Maximum PC* and hardcore PC enthusiasts—so let's seize the opportunity to make the partnership stronger. For 2002, we're planning a number of initiatives to get readers more personally involved in the magazine:

■ **Unexplained Software Phenomena**: *Maximum PC* is first and foremost a hardware magazine, but there's certainly a big software universe out there that shouldn't be ignored. No, we're not talking about office suites and tax preparation wizards. We've covered these dinosaurs before, and you've essentially told us to leave that action to our competitors. So next month we'll feature a new department: Software Freak of the Month. Here you'll find reviews of the PC kingdom's most eclectic programs. Musical instrument tutorials, architectural planners, hardcore mathematic tools—each reviewed by passionate hobbyists in the field. But we need your help! If you know of a software freak that deserves coverage, send a review request to softwarefreak@maximumpc.com.

■ **Reader Rips**: We strive to make our hardware reviews as comprehensive as possible, but there's only so much we can accomplish in 500 to 600 words. So we'll soon feature a new department: Owner Opinions. Here you'll find straight-poop critiques from readers who've already bought the hardware you're still considering. Currently, we're looking for reader reviews of the following specific products: ATI Radeon 8500, Creative Labs Sound Blaster Audigy, Celestix Aries Home Server, and IBM 60GXP hard drive. If you own one of these products and would like to contribute, send an e-mail to owneropinions@maximumpc.com. Provide the precise name/model number of your gear and include a descriptive, 300-word review of your most significant likes and dislikes.

■ **Vote & Win!**: Next month's mag will include a reader survey. Please fill it out to let us know more about which parts of the magazine you like most. We'll take your opinions into consideration when assigning future articles. You don't have to fill out the survey to be eligible for our awesome giveaway prizes, but it sure would be nice.

The *Maximum PC* staff is excited as all get-out over the swank technology and upgrading adventures the new year promises. In fact, we're so damn giddy, we decided to pump up our tagline by 300 percent. Please help us achieve the expanded "Minimum BS" promise by contributing with increased fervor in 2002 and beyond. And with that, we give you "The Speed Issue," the beginning of a new *Maximum PC* tradition that we trust all readers will most definitely enjoy.

— JON PHILLIPS

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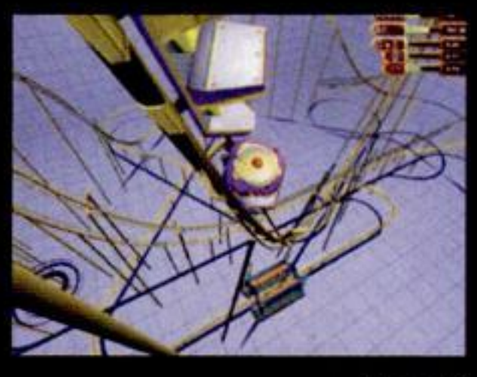

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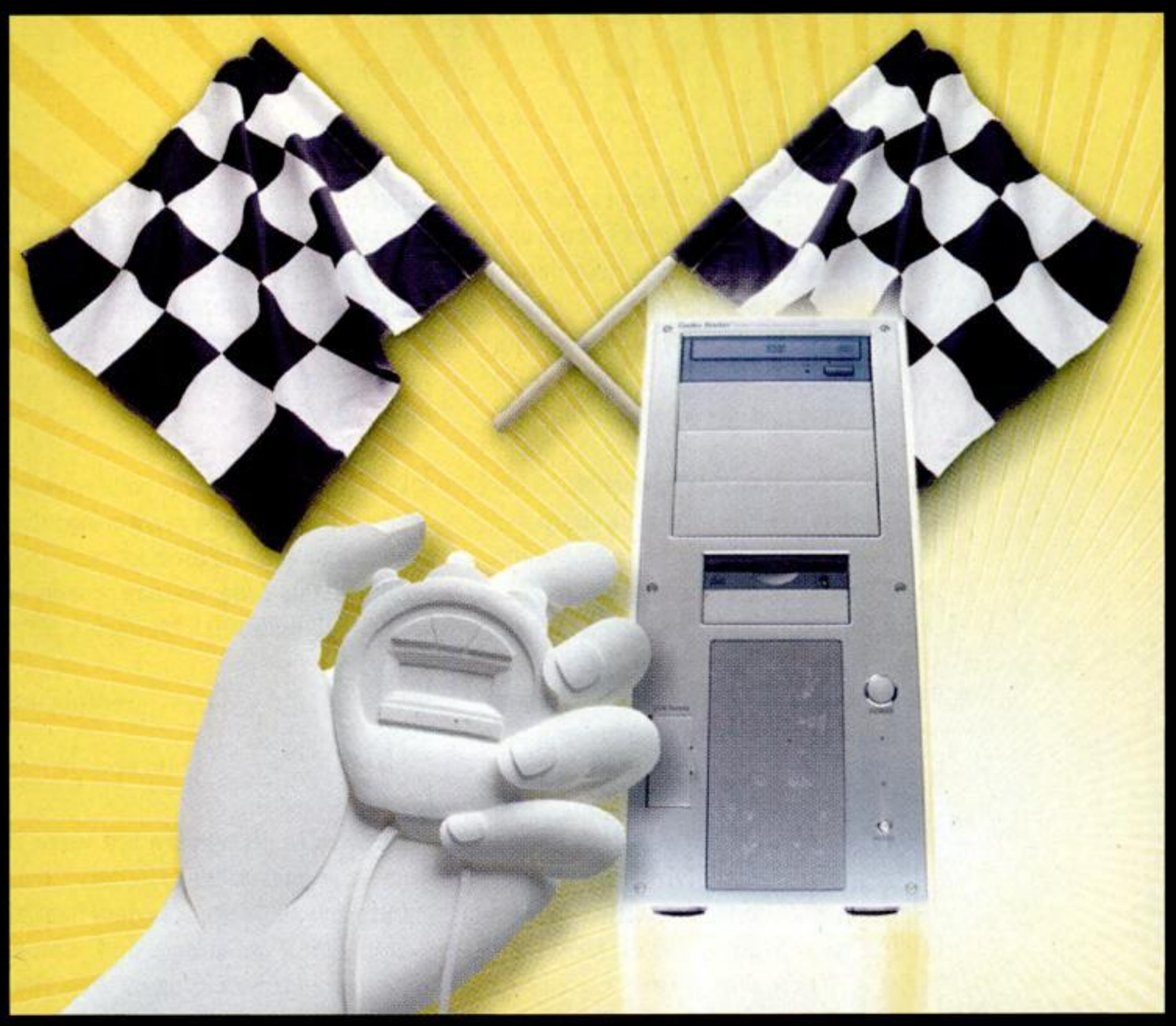

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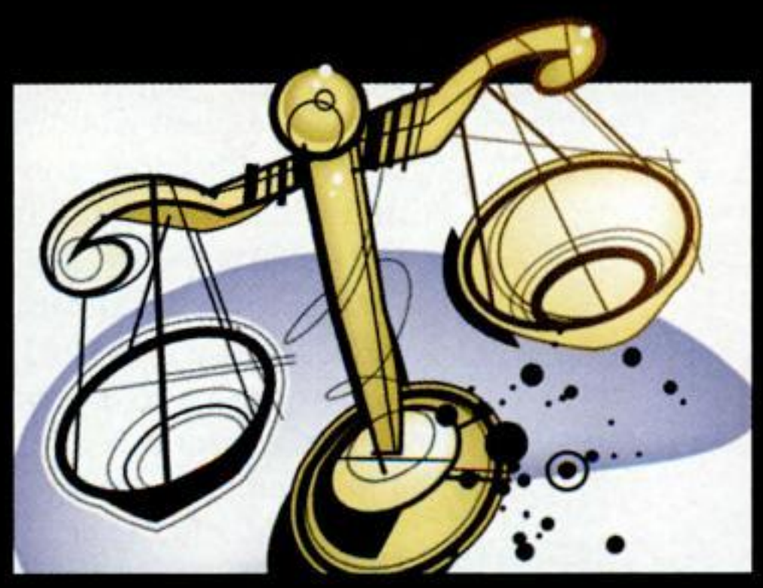
We've got joysticks. We've got gamepads. We've got driving wheels, mice, and more. And we've gathered all these game controllers together under one roof for what promises to be a hell of a show.



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In/Out

You write, we respond

Could it Be...?

I was going through your November issue again (this time back to front), and when I read the Max Payne Look-Alike Contest blurb, I started to think that with a little bit of work, your very own Dick Matthews could pass as a Max Payne look-alike! This is what you would need to do:

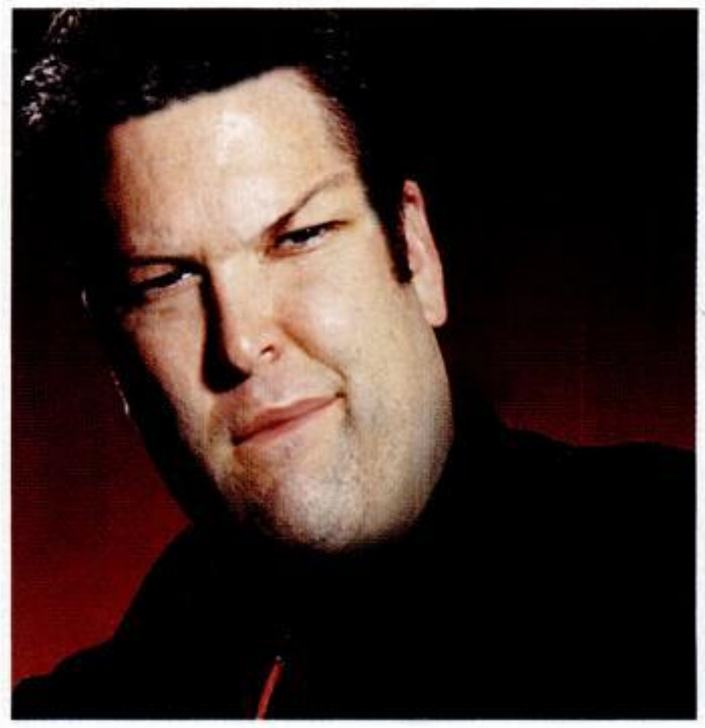
■ Put his head in a vice for ooohhh... about two hours, making his skull more oval instead of square, giving him a longer face. It will return to normal after a few days, I'm sure. (This will work; I saw it in a cartoon).

■ Next, get a strong pair of battery jumper cables and attach one clamp—grabbing as much skin as possible—to the back of Dick's head. This will stretch the skin on his face, giving him those slit type eyes, and that "I was a lousy amateur boxer" puffy-cheeks syndrome. Then attach the other clamp to the back of his neck (providing he has one).

■ Okay, the hair. Well, you gotta work with what you have—or you're not going to have it in the future. So do the best you can.

With all this done, you can proudly add to his credentials: Dick Matthews, MCSE, MPL-A.

—Bill Pinder



ATI, DRIVERS & MAXIMUM PC

In response to the November issue Radeon 8500 review: I think we are being had. Many have already heard that ATI's current drivers thrash visual quality in *Quake III* in order to produce higher benchmarking scores. This produces several key discussions. I am a trusting reader of *Maximum PC,* and if I see a 10 verdict, I trust it's a good buy. So do others. But do people know that *Quake III*'s visual quality will be compromised considerably? The reason I'm so bent on the *Quake III* issue is because *Quake III* is used worldwide as a benchmarking tool, and the issue isn't whether *Quake III* is playable at 1024x768 anymore, but how it performs when comparing the newest cards. So why then does ATI optimize its new drivers to desecrate visual quality for unneeded frame rates? I don't think it's wrong to optimize a game at all. But when [the optimizations] are used as a tool to alter quality and boost frame rates, I think consumers are entitled to that information when they read a review.

–JORGEN HAUGSOEN

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Other readers have taken us to task for our Radeon 8500 review. Here's the deal: We received our Radeon 8500 about as early as humanly possible. In fact, we're pretty sure we were the first news organization to receive the board. Our November issue review beat all other magazines to press and actually hit newsstands before many web sites were able to publish their own 8500 reviews (not bad considering there's a 7- to 10-day delay between when we send an issue to the printer and when the issue is distributed to readers). Unfortunately, in order to make our printer deadline, we had only about 48 hours to test the Radeon 8500.

If we had spent more time with the 8500, *we might* have—once again, *might* have—discovered the driver tweak that Jorgen is referring to (the tweak is also covered in Quick Start this month—and, by the way, ATI has already fixed the tweak). We must humbly admit that while benching the card, we just assumed that no unusual driver tweaking was at hand. That's our bad, and we'll be more cautious in the future by automatically asking all videocard manufacturers to inform us of game- and engine-specific driver enhancements ahead of time. In a perfect world, the onus of responsibility would be on the hardware vendor, but this isn't a perfect world, and journalists must assume nothing.

It must be noted that while benching the card, we noticed no visual problems while running *Quake III,* and even today, some of us find it difficult to notice the visual quality tweaks. We want to assure all readers that if the driver tweak story had been broken before we finalized our review, we would have taken the entire situation into consideration when rendering our final verdict. Also, please remember that videocard reviews in monthly magazines must necessarily be interpreted as "snapshots in time." We gave the 8500 a 10 because it offered the best frame rates (and, well, "non-alarming" visual quality) *at the time of the review.* Its performance beat the performance of a GeForce3 running 12.81 Detonator drivers. One month later, the GeForce3 Ti 500 with updated Detonator XP drivers arrived, and surprise, surprise, nVidia stole the speed crown from ATI.

One final note: If we had run the non-tweaked ATI drivers when we originally reviewed the Radeon 8500, the 8500 still would have beat the best nVidia product during that "snapshot in time." If you're interested in seeing how ATI's finest compares to nVidia's finest in the current "snapshot in time," jump to page 36.

HOLIDAY TRAGEDY PREVENTION, PART II

Thanks for the eggnog recipe [December], but recipes using uncooked, raw eggs should never be recommended. For food safety, you should use only eggs heated to at least 145° F. I'd risk overclocking and overcooking my CPUs but never *under*-cooking my eggs.

By the way, Candy is as hot as the eggs should be!

—NORM AUSTIN

CHIMES OF FREEDOM

Like many Americans, I have been

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THIS CHANGES EVERYTHING™

RADEON™ 8500

Brand yourself a warrior with the incredibly fast 64MB DDR, high-resolution 3D graphics of RADEON™ 8500. Get the most out of today's hottest 3D games and experience the most immersive 3D gaming imaginable. RADEON™ 8500 changes everything.

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MAXIMUM PC KICK ASS PRODUCT

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dragging my sorry butt around for the last several weeks, wondering just what it is I feel. This free-floating malaise has clouded over most of my interests aside from my son's weekly football game. Sadly, this has included my technology jones. Who wants to read over specifications and settings to see if we can make our toys run better at a time like this?

So, I toted the November issue around, unopened, in my briefcase for a couple of weeks. Until today, when I scanned the magazine while I was taking a wee break in that room down the hall. Right away I could see that Jon Phillips's heartfelt and well-chosen words and the on-target reader polls lent a mature focus not often found in my favorite rowdy tech mag. Now I can't wait to get home to start chewing on the meatier-than-ever articles! Count me among satisfied long-term subscribers. As Bob says: "... the hypnotic, splattered mist is slowly lifting...." America still rocks!

—JACK LAVELLE

LET THE WTC STAND

I have noticed that all too many people have been pulling the World Trade Center's image from movies and, as with *Red Alert 2*, even from games. Personally, I find this disturbing. We dishonor those who died in the Sept. 11 attacks by refusing to face the fact that it happened. We should proudly display images of the WTC in its former glory as a testament that America will not cower in fear. Removing the WTC from our lives is comparable to tearing down the Pearl Harbor Memorial over the U.S.S. Arizona! It's just not right.

—ROBERT MITCHELL

NOW WITH LESS ANTHRAX!

I just received the November issue of *Maximum PC* and, to my horror, a "1000 Hours Free" AOL sign-up CD. My first thought was, "Say it ain't so!" It's hard to believe that a well-written, no-holds-barred publication such as *MPC* would resort to consorting with the AOL boys. To me, AOL represents software that will never be successfully de-installed, a blatant come-on (1000 hours in 45 days is over 22 hours per day), and an insult to your readership, very few of whom, I would venture to say, subscribe to a "consumer" online service.

Then I read the issue from cover to cover, as always. Same tough standards—not all reviewed products make the grade. The CPU Field Guide was written to teach *everyone* something. It appeared that the only thing different was the plastic overwrap and CD.

That got me thinking: You delivered my favorite magazine with the added bonus of a pristine cover and Anthrax repellent wrapper. No more dog eared pages! No risky germs inside my magazine. And this added protection was provided by the evil empire—AOL/Time/Warner/Turner/etc! You are fiendishly clever and should be praised and thanked by your loyal subscribers. Count on me at renewal time!

—BOB GROSSMAN

OK, SO IT'S NOT THAT GREAT

I'm a bit confused (and it's not my normal state of confusion). I just read the Must-Have Hardware article [November] and in it you list the Matrox G550! First off, you put it in the "we-didn't-know-anybody-needed-this" category *within* the Must-Have Hardware article, then in the reviews section you give it a 3 verdict! Doesn't seem like much of a "must-have" item to me. What gives?

—HIROKI

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: This wasn't so much an error in technology judgement as it was an error in "article purity." For the most part, the article was indeed our report on must-have hardware. But in the videocard section, we unfortunately dropped the "must-have" requirement and simply reported on the latest videocard arrivals. We apologize for the confusion.

SOUTHERN-FRIED FRIENDLINESS

I picked up and browsed the November issue of *Maximum PC* and came across a short article by Will Smith titled Head2Head. Smith refers

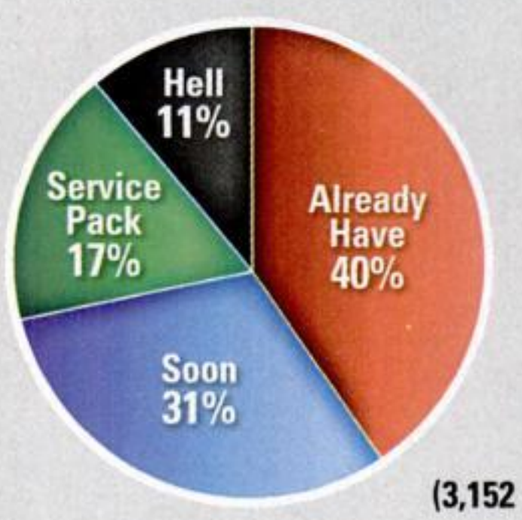
MAXIMUM PC's

READER PULSE POLLS

Your vote counts!

Please contribute to our reader polls at www.maximumpc.com.

When will you upgrade to Windows XP? a) Already have, b) very soon, c) after the first service pack is released, or d) when hell freezes over!



(3,152 votes)

Curious results. Letters to editors have reamed us for our positive review of WinXP, so we naturally assumed that Maximum PCers would mostly reject the new OS. Apparently not.

What's the most you would pay for a monthly subscription to your favorite PC tech web site? $30, $20, $10, $5, $2, or NOTHING?

(3,349 votes)

WinDrivers.com, one of the most useful downloading sites online, is now charging $29.95 for yearly subs. The ad banner is dead, so something had to give. It will be interesting to see if hardcore sites can buck our survey results.

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to "dirty, stinkin' Mac users" when describing Apple's new OS X Control Panel operation. What? Why are Mac users "dirty" and "stinkin'?" What an a$$hole! The rest of the article follows suit. Very biased, very anti-Apple for some unknown reason. Maybe someone proved him wrong at some point and now he's out to get even—who knows! Not that you care, but I won't be reading your mag again, I think I'll look for more informative and unbiased thinking—if I can find it.

—GARY SMITH (NO RELATION!)

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Our good Mr. Smith certainly has a way with words, doesn't he? Actually, if you knew him, you'd know he uses the combined modifiers "dirty, stinkin'" in just about every other sentence, as in, "Phillips, you're dirty, stinkin' San Francisco scum!" See, Will's from Tennessee, and that's just the way he shows respect and affection for others.

HINT: PICK A *WINNING* BATTLE

I just wanted to inform you and your readers that the USB 2.0 you reviewed in your "Must-Have Hardware" feature [November] is a rather pointless piece of technology, since FireWire is a better standard that is more widely supported and already has hardware made for it.

—DANNY YEE

FEATURES EDITOR LOGAN DECKER REPLIES: We agree that FireWire is a fine standard. In fact, for a while it was the *only* practical option for high-speed external peripherals, which made it such a big hit with the digital video crowd. But not only does USB 2.0 offer a fat 480Mbps pipe, but it's also backwards-compatible with USB 1.1 (although 2.0 peripherals are restricted to 12Mbps max with the 1.1 connection). Even better, motherboards are already shipping with USB 2.0 built in and ready to go. We're already seeing a steady stream of USB 2.0 products coming into the Lab, and if this year's showing at COMDEX was any indication—USB 2.0 had a huge pavilion with a bazillion devices while FireWire was, uh, here and there—there's no question that manufacturers are adopting the standard with glee.

It's not that we think FireWire is going to be extinguished—we believe it will remain the standard for video applications and those Mac-type things—but USB 2.0 will take over as the connection of choice for just about everything else. ■

LETTERS POLICY: ***MAXIMUM PC*** invites your thoughts and comments. Send them to **input@maximumpc.com**. Please include your full name, town, and telephone number, and limit your letter to 300 words. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.

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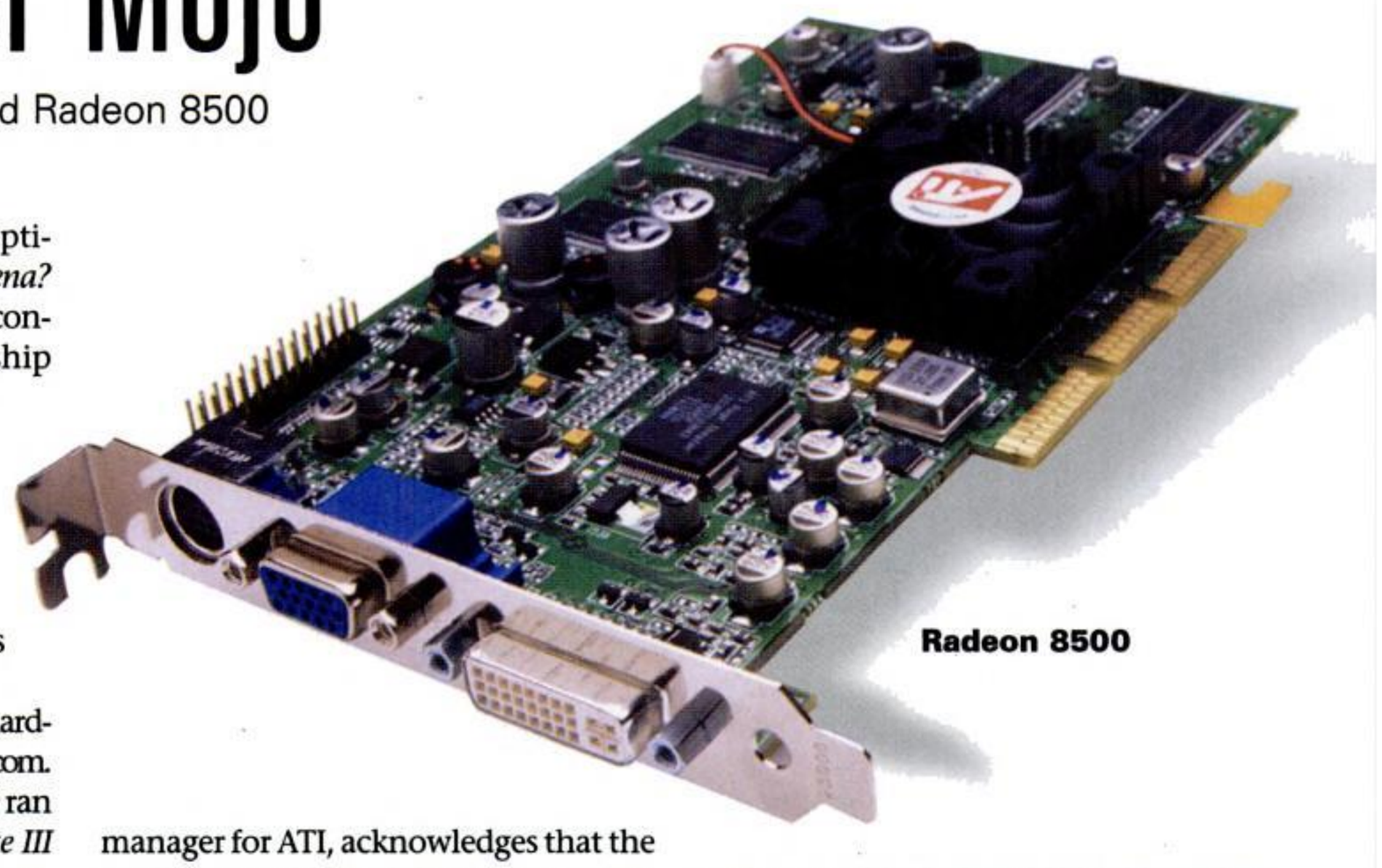
Quick Start

The beginning of the magazine, where articles are small

ATI's Bad Driver Mojo

Allegations of 'cooked' drivers swirl around Radeon 8500



Radeon 8500

Did ATI cheat or did it simply optimize its drivers for *Quake III Arena?* That's the thorny question that continues to embroil ATI and its flagship videocard, the Radeon 8500.

Soon after the October launch of the Radeon 8500, allegations surfaced that the drivers for the card surreptitiously lowered the visual quality settings of *Quake III* in order to achieve higher frame rates during benchmarking.

The incongruity was discovered by hardware muckraker Kyle Bennett of Hardocp.com. Bennett found that the Radeon 8500 ran slower when the name of the *Quake III* executable was changed. Since that revelation, enthusiasts have railed against ATI for "cheating" on its drivers. But is it cheating or optimizing? John Carmack, who developed *Quake III,* weighed in saying that baking drivers to run only one game faster is simply unethical.

"Making any automatic optimization based on a benchmark name is wrong. It subverts the purpose of benchmarking, which is to gauge how a similar class of applications will perform on a tested configuration, not just how the single application chosen as representative performs," Carmack writes in his online .Plan update.

Dave Nalasco, a technical marketing manager for ATI, acknowledges that the card's original boxed drivers were optimized for *Quake III,* but says the company's intentions were not to "cheat" for one benchmark, but to give all gamers higher frame rates in games based on the *Quake III* engine. What happened, Nalasco says, is that the initial drivers addressed only *Quake III* because the company didn't have enough time to optimize for all *Quake III*–based games. He adds that newer drivers address all *Quake III*–based games—and don't reduce visual quality settings.

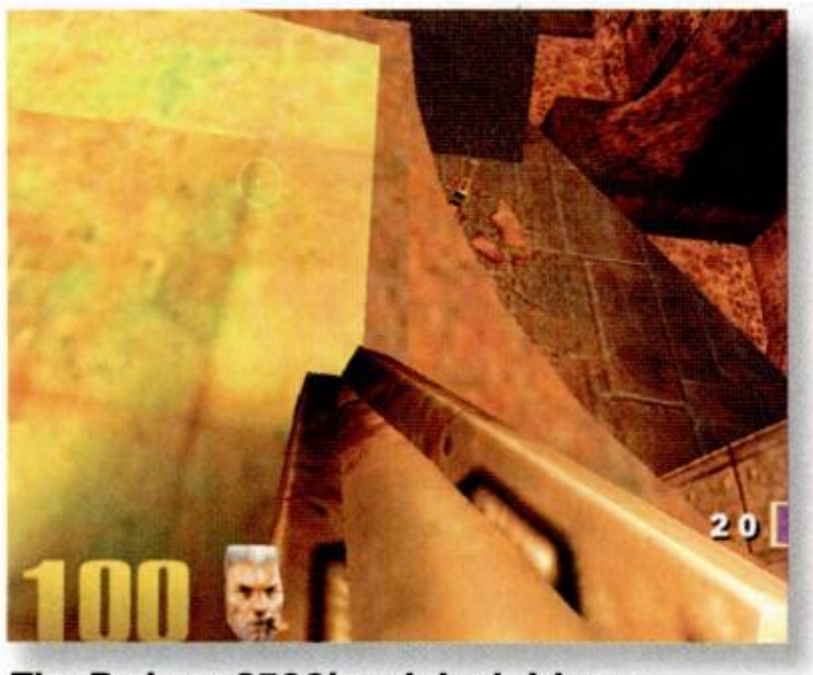
Nalasco says the visual quality setting brouhaha is the result of a driver error. Using the original drivers—essentially the same drivers *Maximum PC* used in its evaluation of the Radeon 8500 in November—the videocard overrides the texture quality lever in the game setup panel, resulting in slightly blurrier graphics.

"Once we realized this was the issue, we issued new drivers and fixed it. The full image quality is back, and there is no difference in performance," Nalasco tells *Maximum PC.*

Nalasco denies allegations that the original driver optimization was a cheat, and says a frame rate gain of just one to two frames per second wouldn't behoove any company that was concerned about its reputation. "It's important for us to be able to say that we have the best product on the market," Nalasco says.

Maximum PC's own comparative tests with the original driver and fixed driver show roughly a 5 percent difference in performance—slightly more than Nalasco's claim of 1 to 2fps. The original driver tweak, of course, did not affect DirectX titles. To see the latest showdown between the Radeon 8500 (with its new drivers) and nVidia's GeForce3 Ti 500, flip to page 36.

In the end, the driver fracas won't amount to much, says Jerry Frankel, editor-in-chief of the Peddie Report, a leading industry newsletter. "Do I think this will do irreparable damage to ATI's reputation? No, not in the long run." Frankel says the videocard trade is a competitive business with a lot of cash up for grabs, and all parties are likely to have missteps.



The Radeon 8500's original drivers notched down the texture quality.

The new "non-cheating" drivers give you full texture quality in *Quake III Arena*.

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Amazing Stories!

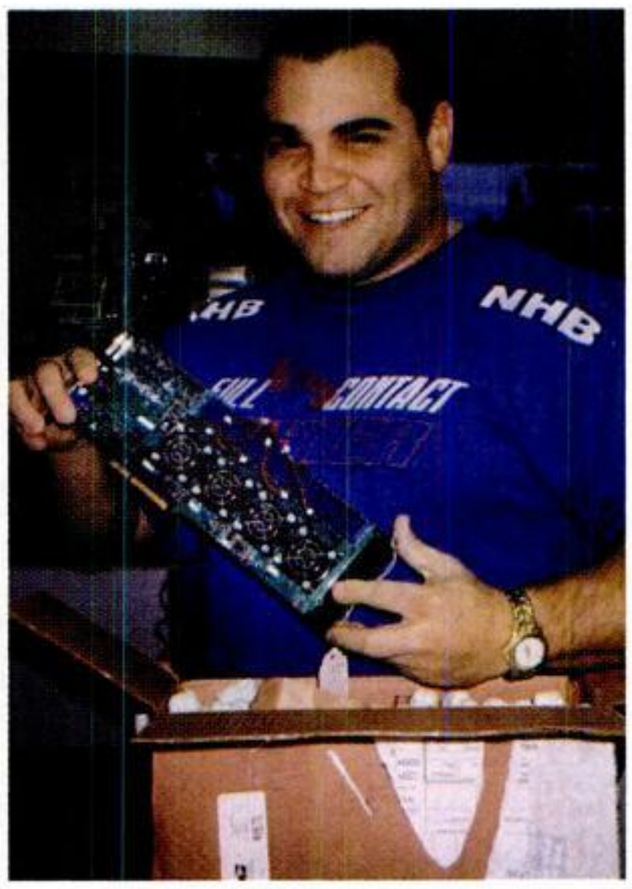
Raiders of the Lost Videocard

How 3dfx's historical anomaly garnered over $2,000 on Ebay

Even by today's standards, the specs of the 3dfx Voodoo5 6000 videocard sound impressive: four independent VSA-100 graphics chips working in concert and 128MB of dedicated video RAM. But should a technology valued at just $600 retail in early 2000 really garner $2,150 in an October 2001 Ebay auction?

You decide. The "V56K" represents the last gasp for 3dfx, the company that essentially defined the PC as a gaming platform. Add the fact that the V56K was never officially released, and that just a handful of working engineering samples fell into consumer hands, and you have yourself the rarest of PC treasures. If this board were a postage stamp, it would be the "Inverted Jenny." If it were a baseball card, it would be the 1910 Honus Wagner. The V56K was to have been the 3dfx flagship videocard, but instead became an irresistible historical artifact when the company went under in late 2000.

Kevin Psaila, a competitive no-holds-barred fighter from British Columbia, put the card on Ebay after he suffered a serious quadricep tear in the ring and needed to liquidate his "luxury items" to keep himself financially afloat. The auction started at $330 and involved 52 different bids. Ralf Schweigel from Germany eventually won the card.



Extreme fighter Kevin Psaila made the ultimate sacrifice when he decided to send off one the rarest videocards in existence.

Both Psaila and Schweigel are longtime *Maximum PC* readers, and both say they value the V56K not for its historical significance, but rather for its rendering prowess! Yes, folks, the V56K isn't a museum piece to these dudes, but rather the epitome of "must-have hardware." You can read the entire story—and learn how Psaila came to own such a curio—by visiting the reprint section of **www.maximumpc.com**.

Spec Watch: Wireless Networking

Actiontec 802.11a

Two new specs are competing to replace 802.11b, the current mainstream wireless standard, which peaks at 11Mbps. Here's a quick cheat sheet on the contenders.

THE SPECS

- 802.11a (or simply "11a") will be promoted by card vendors Proxim and Actiontec using chipsets from Atheros. It will hit 54Mbps.
- 802.11g (or simply "11g") will be promoted by Linksys using chipsets from Intersil. It will also hit 54Mbps.

THE DIFFERENCES

- 11a operates in the 5GHz spectrum. The 5GHz spectrum is unregulated, but because little equipment operates there yet, interference should be minimal. Because it operates on a different spectrum, 11a will not be backward-compatible with 11b equipment.
- 11g operates in the 2.4GHz spectrum, where there's clutter from microwave ovens, phones, and Bluetooth. But it *will* be compatible with 11b equipment.

AVAILABILITY

Equipment using the 11a spec is already available, but at a high price. The competing 11g equipment will not be available until the first quarter of 2002.

There you have it—the choice is yours!

FAST FORWARD

BY TOM R. HALFHILL

Give Your PC the Finger

Millions of people flip off their PCs every day—usually after a system crash. But the day is coming when your computer will *dare* you to give it the finger.

I'm not talking about road rage on the information superhighway. This is about fingerprint recognition as a substitute for old-fashioned password security. Actually, fingerprinting is just one facet of *biometrics*—the science of measuring your physical characteristics for the purpose of identification. Other biometric methods can analyze your whole hand, face, iris, retina, voice, signature, typing rhythm, or scent. Someday your computer might even check your DNA.

The goal of biometrics is to identify users without requiring them to remember passwords or PINs (personal identification numbers). The main problem with passwords is that good ones (nonsensical combinations of letters and numbers) are difficult to remember, so people tend to forget them or jot them down, which is bad. Also, few people change their passwords as often as they should. It's a growing problem because more and more web sites, bank cards, and other services require passwords. Biometrics turns your body into a password that's difficult to steal, forge, or lose.

Some people worry about loss of privacy, but biometric systems typically don't store an image of your body part. That's inefficient. Instead, they digitize a few vital characteristics to verify that your thumbprint, for example, matches the characteristics in their database. Somebody else's record might have virtually the same characteristics, but unless that person is also using your name, there's almost no chance of misidentification. The chance that a criminal hacker would share your physical characteristics is practically nil.

Biometric accuracy is very high under controlled conditions—such as a fingerprint scan on a special pad attached to (or built into) a PC, PDA, cell phone, or ATM. Several laptop computers from Acer, Compaq, NEC, and Toshiba already have such pads. Biometric accuracy drops sharply under uncontrolled conditions, such as the face-recognition scanning that some people are advocating to identify suspected criminals and terrorists in public places. With existing technology, the false positives and false negatives are so numerous that such systems are nearly useless. However, a controlled face scan at an airport boarding gate could be very accurate.

The rising demands for physical safety, secure online commerce, and easy identification—along with the rapidly falling costs of biometric technology—virtually guarantee that some part of your body will become a key in the near future.

Tom Halfhill was formerly a senior editor for Byte *magazine and an analyst for* Microprocessor Report. *He is now a technical writer/analyst in Silicon Valley.*

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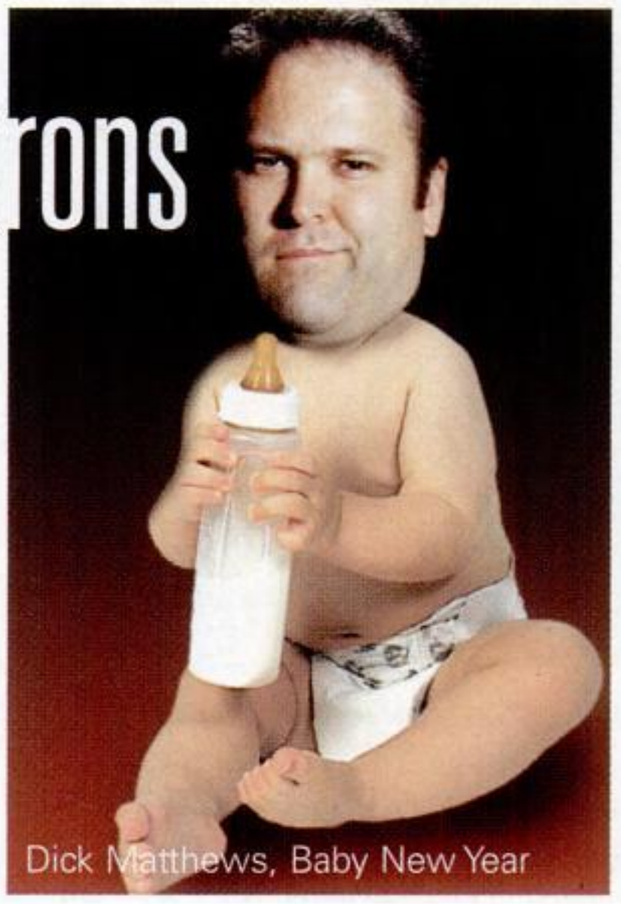
HELPFUL HINTS

Windows Tips for Morons

Welcome to the year of the Dick


Dick Matthews, Baby New Year

The new year is upon us, which means it's time for more of Dick's tough love. That whoremonger Phillips cut my space this issue, so you, my loyal fans, are the ones who'll bear the burden of only one tip this month.

But, oh, what a tip it is. Did you know that Windows XP (and Win2000, for that matter) allows you to mount hard drives as folders in a pre-existing hard drive by using the Computer Management applet in the Administrative Tools Control Panel? This will let you seamlessly move all your apps or games onto a new drive without having to reinstall them, thus freeing space on your old drive and taking advantage of the new drive at the same time. Here's how to do it:

Take the directory you want to move to the new drive—the directories that hold your games or MP3s are the obvious candidates—and copy every file and folder in it to a newly installed and NTFS-formatted drive. After you're sure they've been copied, delete them from the original drive. Now, go to the Control Panel, open Administrative Tools, and fire up the Computer Management applet. Open Disk Management and right-click your new disk. Select the "Change Drive Letter and Paths" option, and press Add. Select "Mount in the following empty NTFS folder," and point it to the newly empty folder on your C: drive. That's all there is to it.

Virgin Ditches Bulky Boxes

Cost-savings parlayed into cheaper prices for all its game titles

It took more than two years, but a major game publisher is finally fulfilling the vision of a December 1999 *Maximum PC* editorial in which we exhorted the PC gaming industry to abandon elaborate product boxes in favor of more environmentally friendly packaging. Now, we're not saying Virgin got the idea from us, but it's uncanny how closely the game distributor's new plan mirrors our own.

Virgin has announced it will begin packaging all its game titles in small containers the size of a DVD movie box. The company will also forgo large, paper manuals in favor of electronic manuals burned onto each game disc (truly petty gamers can contact Virgin to receive printed manuals).

But this new packaging scheme isn't just about environmental-friendliness: Virgin is parlaying the cost-savings of reduced packaging into reduced prices for all its games. All Virgin titles—even its A titles—will now cost just $20. Frederic Oualid, vice president of marketing of Titus Software (Virgin's parent company), is the man behind the plan.

This is what *Maximum PC* would like to do to all game packaging (image from our December 1999 editorial).

"This is absolutely a positive influence on the environment," says Oualid. "Smaller packages equal less paper and lighter weight, which means easier transportation and less garbage going to the dump.... The consumer is now buying entertainment and not a flashy package. We don't feel that a plastic disc should cost a gamer 60 bucks."

We tip our hats to Virgin. It's always chagrined us to know we've been paying extra money for double-laminated, foil-embossed boxes that end up in the trash anyhow. Now, if Microsoft would only parlay the revenue generated by Product Activation into reduced OS prices for all....

FUN-SIZE NEWS

IBM Doubles Its HD Capacity

IBM is pushing forward with a new 120GXP hard drive that doubles the size of its beloved 60GXP to 120GB. The 120GXP packs 40GB per platter and ships in 40GB, 80GB, and 120GB sizes. Spinning at 7200rpm, the 120GXP stays on the ATA/100 interface instead of falling in line with Maxtor's push to the ATA/133 interface. IBM has also released a 60GB version of its popular Travelstar series for notebooks and high-density server clusters. The Travelstar 60GH packs 15GB per platter in a 2.5-inch formfactor.

Broadband Your Wires

Linksys is now offering networking equipment that lets you share broadband over a home's electrical grid at up to 14Mbps. Linksys's HomePlug 1.0 is the competing spec to Inari's 1.5Mbps technology. Of course, both specifications are incompatible. Linksys' line of HomePlug equipment includes a router for $180, an Ethernet bridge (for people who already own routers) for $150, and a USB adapter for $150. Up to 16 nodes can be supported. Expect MP3 players that plug into an outlet in your bedroom or backyard—just set up your PC as a music server, and you'll be good to go.

Sharp's Linux PDA

Linux may not be lighting desktops on fire, but Sharp hopes the free OS will provide an alternative to the Palm and Microsoft OSes. Sharp's new PDA will feature a mini-version of the *Opera* browser and a 16-bit color, touch-sensitive screen with pen input. But the slickest feature of the new Sharp PDA may be its built-in keyboard. Sliding away the lower portion of the PDA reveals a RIM-like keyboard. The unit will use a StrongARM CPU clocked at 206MHz. The company hopes to harvest the fruits of the open source community for applications and other wares.

Broadband Modems to Add Safety Features

It's no secret that hooking up your PC to a broadband connection makes you vulnerable to malicious attacks that you wouldn't be as susceptible to using an analog modem. To address this problem, Sofaware will integrate stateful packet inspection—something normally found only in high-end equipment—into cable and DSL modems. The company is also teaming with ISPs to offer the protection directly from the ISPs as a service. Sofaware hopes that consumers will be willing to pay for the added broadband security as well as the ability to have e-mail and attachments scanned before they hit your PC.

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TURBO-COOL 350 ATX
TURBO-COOL 450 ATX
TURBO-COOL 450 A4 (Tyan 2462)
TURBO-COOL 450 XE (SuperMicro P4DC6)
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PERSONAL MID-TOWER CASE

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Distinctive style, heavy-duty construction, 10 drive bays, AT/ATX compatible, extra cooling and EMI suppression. You can't beat our **all-steel, USA-made** full-tower cases! Std. beige or deluxe version with casters, bold black finish, and a **bright chrome** bezel.

SOLID-STEEL TOWER CASE
DELUXE CHROME TOWER CASE

SLEEKLINE™ SYSTEMS

How can a compact **SleekLine 1260 System** beat a Dell™ PC, when Dell has a higher clock speed and a box that's 4X larger? The answer—superior M/B and CPU!

The innovative SleekLine 1260 business computer features Intel's high-performance Micro-ATX Server Board and the amazing 1.26GHz Tualatin processor with **512K Cache** (double the Cache of a Pentium 4).

PERFORMANCE COMPARISON

COMPUTER	SIZE (cu in.)	PERFORMANCE[1]
SleekLine 1260	525	50 (22% faster)
Dell 1.7GHz GX440	2438	41

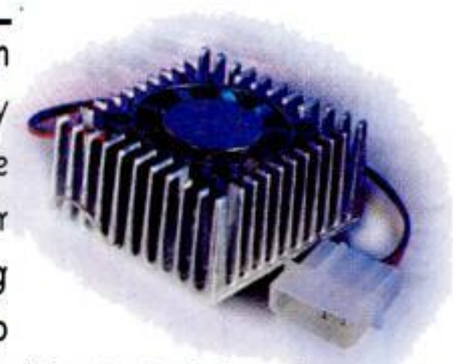
[1] As measured by PC Magazine's Business Winstone 2001.

SleekLine comes with 256MB SDRAM, 40GB IBM hard drive, built-in 10/100 Ethernet, high-resolution 3D graphics, and a stylish, space-saving, USA-made enclosure that can be mounted, stacked, or carried!

SLEEKLINE 1000 (ASUS M/B, 1GHz Pentium III)
SLEEKLINE 1260 (Intel M/B, 1.26GHz Tualatin)

CPU COOLERS

INTEL®



Processors run hot, often over 230°F! Cool'em by 90°F-140°F with genuine **CPU-Cool™** coolers. Their long-life, ball-bearing fans are *integrated* into patented, die-cast heat sinks. **Last 10 times longer** than cheap imitations! USA-made. 5-year warranty.

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CPU-COOL Z1-HF (Pentium III, FC-PGA)
CPU-COOL 1U (Pentium III, FC-PGA,1U)
DUAL CPU-COOL X2 (Xeon, redundant)
DUAL CPU-COOl P4 (Pentium 4, redundant)

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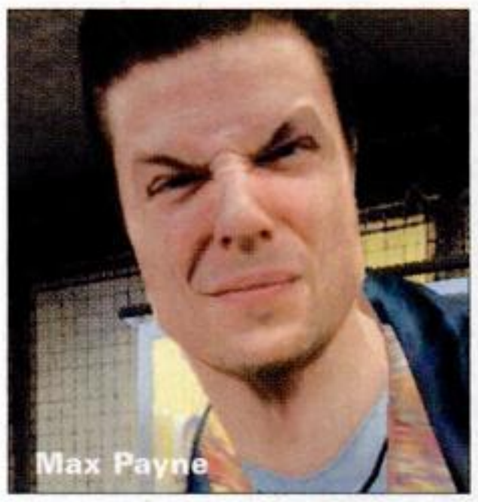
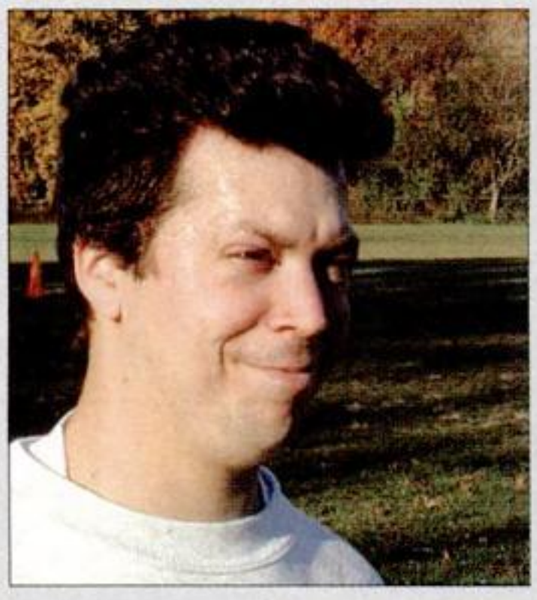
No Payne, No Gain

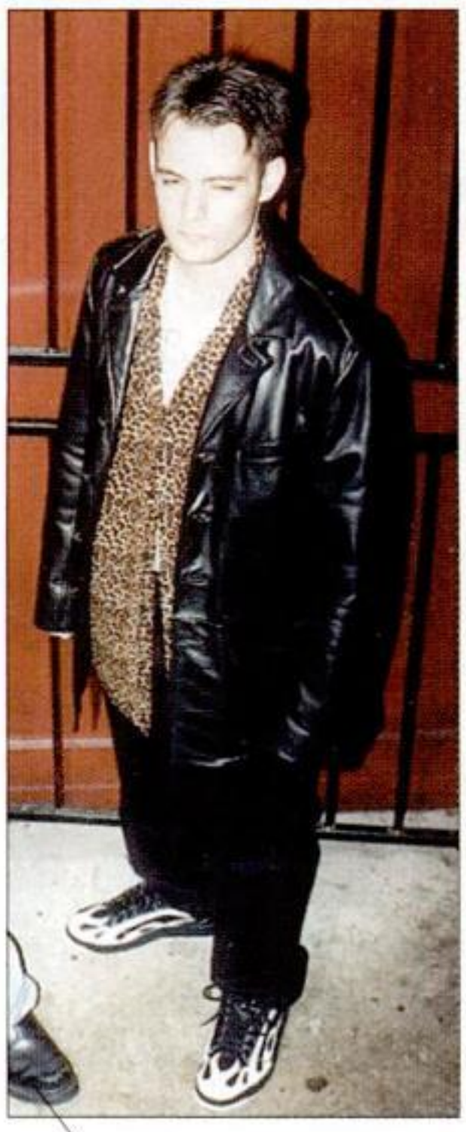
Meet the winners of our Max Payne Look-Alike Contest

You ever notice that the face and body modeling of Max Payne, the protagonist of the eponymous game, looks a little too young and scrawny to represent a hard-boiled New York city cop? Actually, Max looks a lot like a GenX game developer—which should have been good news for the more, uh, shall we say, "slovenly" readers who entered our November 2001 issue Max Payne Look-Alike Contest. This month we announce the winners. All three won TDK Mojo CD-MP3 players. Hooray! (And thanks, fellas, for being good sports about our embarrassing captions.)


Max Payne



Best Physical Likeness: Ray Callanta's friend, "Angelo" Yes, dear reader, this is what the Max Payne Look-Alike Contest has come to—some guy named "Angelo." Does "Angelo" have any idea he was entered in a look-alike contest? Lord, we hope so. Will Ray Callanta be kind enough to give "Angelo" the TDK Mojo? If there's any decency left in this world, yes. Should "Angelo" quit lurking around the soccer field? That's for the cheerleading squad to decide.



Most Creative Image Submission: Cory Bradley Yee-haw! You go, Cory-Man, you Bullet Time–crazy sumbitch! Cory was actually one of a small group of readers who got all Jackie Chan on us and decided to pull their own stunts. The Corster writes, "That's a real explosion, just for you guys! I burnt off a lot of hair doing that!" Yeah, yeah, burnt hair. Very painful. We get it. What else do you do with your free time—pretend you're Goldberg in the backyard?

Best Costuming: Jesse R. Warden OK, Jesse. We give you kudos for a more-or-less correct jacket, and short hair in the general Max Payne neighborhood (though you could stand to learn a thing or two about pompadours from "Angelo"). You won the Mojo, however, because of your disco shirt—it screams Payne. But next time, ditch the damn basketball shoes and borrow the street shoes of the dude on your right! This is the Maximum PC Max Payne Look-Alike Contest, not a trip to Hat Day at Shea.

GAME THEORY

BY THOMAS L. McDONALD

Terrorism Is Not Fun

With the post office that sorts my mail—along with four others in the area—closed because of anthrax contamination, and the country dealing daily with the horror of terrorism, the last thing I expected to see cross my desk was a game in as execrable bad taste as *World War III: Black Gold*. Weapons tipped with chemical/biological material and suicide truck bombers shouting "jihad" as they slam into American bases would have seemed questionable at any time, but at present it is appalling content for a game. The most tasteless aspects could have been easily removed if the developers at Reality Pump cared enough, leaving the middling-to-poor RTS gameplay intact. Hollywood delayed the release of several huge movies and is altering others (such as *Spider-Man*) at considerable expense, but JoWood couldn't be bothered. Maybe they feel snug and cozy in Rottenmann, but on this side of the Hudson River life hasn't returned to a state of normality where suicide bombers qualify as entertainment.

■ **On the shelves of your local EB you'll find row after row of quality PC games: *Civ III, Trade Empires, Silent Hunter II, Rail Across America, Dark Age of Camelot, Return to Castle Wolfenstein, Ghost Recon, Monopoly Tycoon, Zoo Tycoon, Myth III, Alien v Predator 2,* and more. If PC gamers bitch about the offerings for this holiday season, then they are ingrates deserving a lifetime with nothing but *Ms Pac Man: Quest for the Golden Maze* on their hard drives. The problem? Everyone is huddled around the Xbox and Cube demo units. The PC games are sitting lonely and forlorn on their side of the store, taking up shelf space EB would probably rather use for larger Xbox posters so you can really soak in that puke-neon-green color of the logo. This season will probably be very good for the overall game industry, but I have a feeling the PC gaming sector is going to get smacked silly despite its high-quality offerings.**

■ **To the surprise of absolutely no one but Electronic Arts, EA.com has crashed in a spectacular tangle of wasted cash, squandered talent, and management of such rank incompetence they should be sentenced to a lifetime of playing *Majestic*. After killing *Origin* and *Kesmai*, and frittering away the golden goose that was *Ultima Online* in order to bring us subscription versions of *Poppa Zoppa*, the company deserved no less. A subscription online gaming service offering access to multiple quality titles is not only viable but inevitable. What's shocking is that a company as huge, talented, and experienced as EA would have put such putzes as John Riccitiello and Jack Heistand in charge of this revolutionary undertaking.**

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

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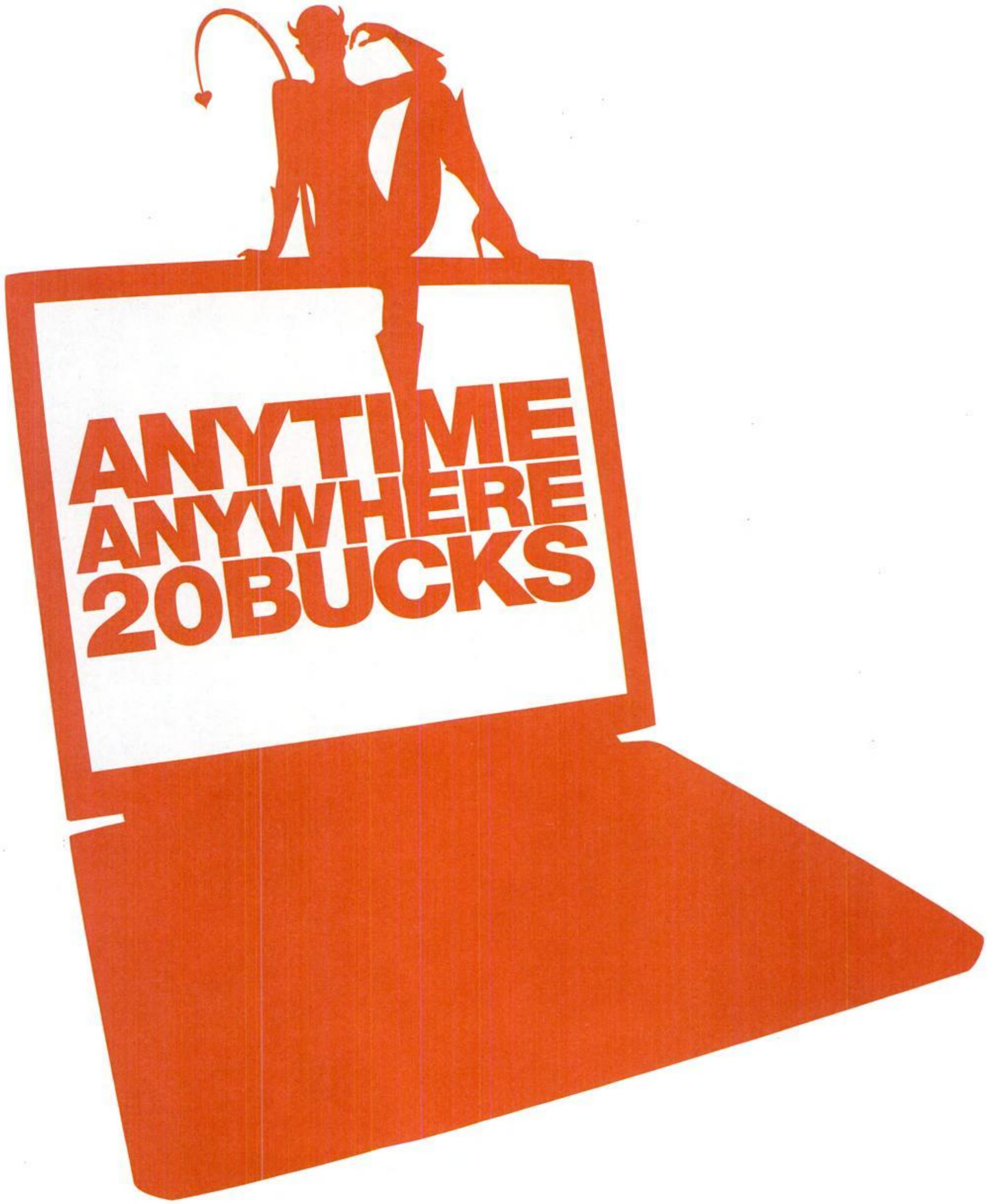

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play games.

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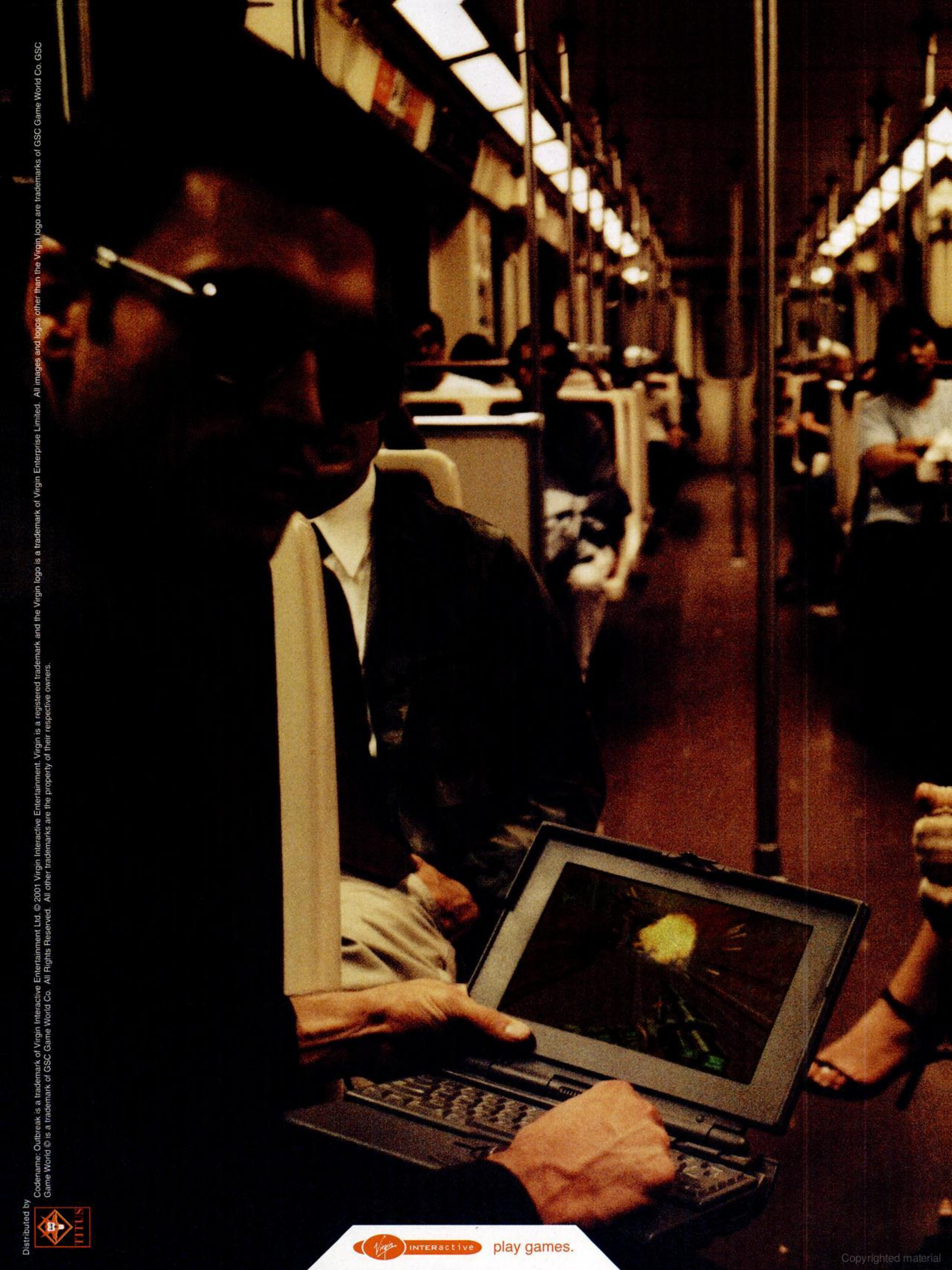

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INTERactive play games.

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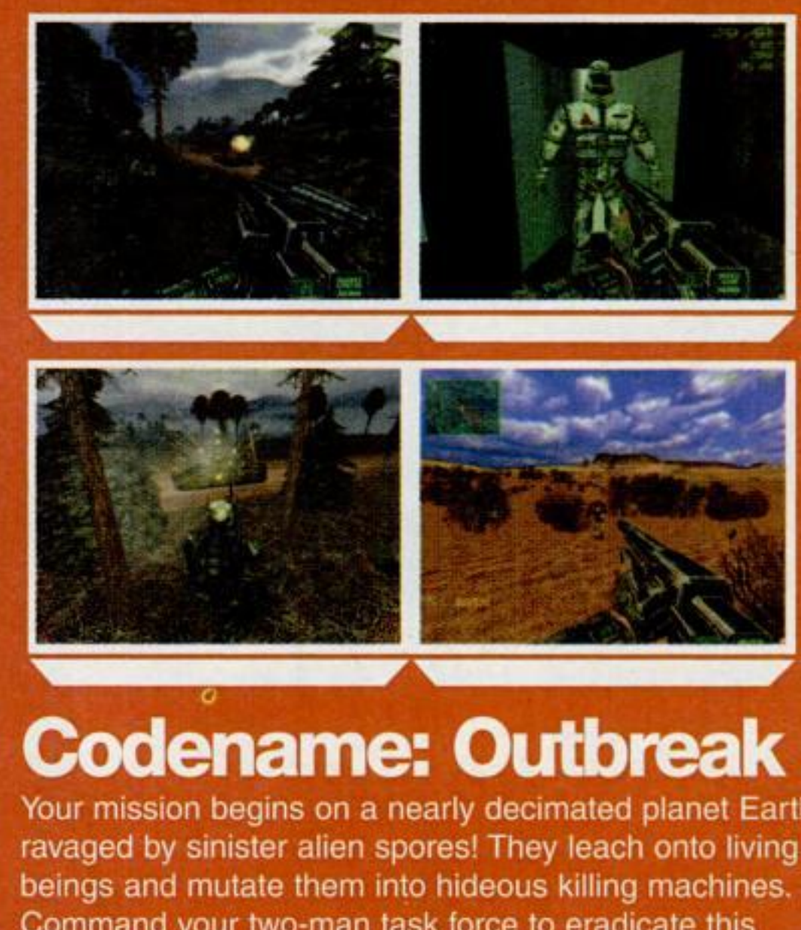


Codename: Outbreak

Your mission begins on a nearly decimated planet Earth ravaged by sinister alien spores! They leach onto living beings and mutate them into hideous killing machines. Command your two-man task force to eradicate this terrible infestation and salvage what is left of the planet before it's too late.

:: 14 single player and co-operative missions.

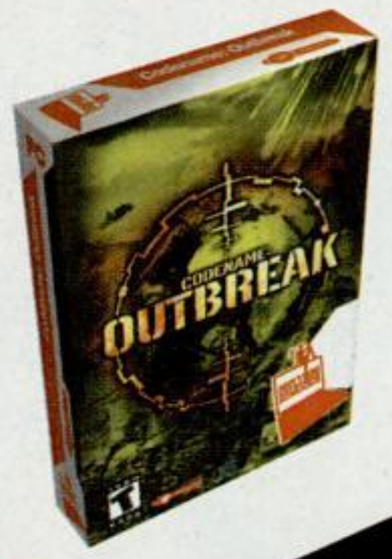
:: Stunning detail and extensive landscapes bring this futuristic battlefield to life.

:: Features Advanced artificial intelligence and realistic enemy reactions.

:: Select from both day and night campaigns.

:: Play in both stunning 1st person and 3rd person views.

:: Extensive multiplayer features.



ANYTIME
ANYWHERE
20BUCKS

Developed by

GAME WORLD

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Blood
Violence

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Nightstone

:: Three playable characters. Choose among a Barbarian, an Amazon and a Wizard. Play as up to three characters at the same time.

:: Unique combination of RPG/Adventure/Strategy.

:: Enhanced enemies AI: The enemies can detect you by sound and vision.

:: Non linear gameplay, a total of 35 levels, in the shape of standalone missions.

:: Three different multiplayer modes: Deathmatch, Team Play or "Find the exit" with special maps, for up to 8 players connected to a LAN or via Internet.

:: Very easy to use level editor: build new levels to play on-line and add scripts to items and enemies in real time.

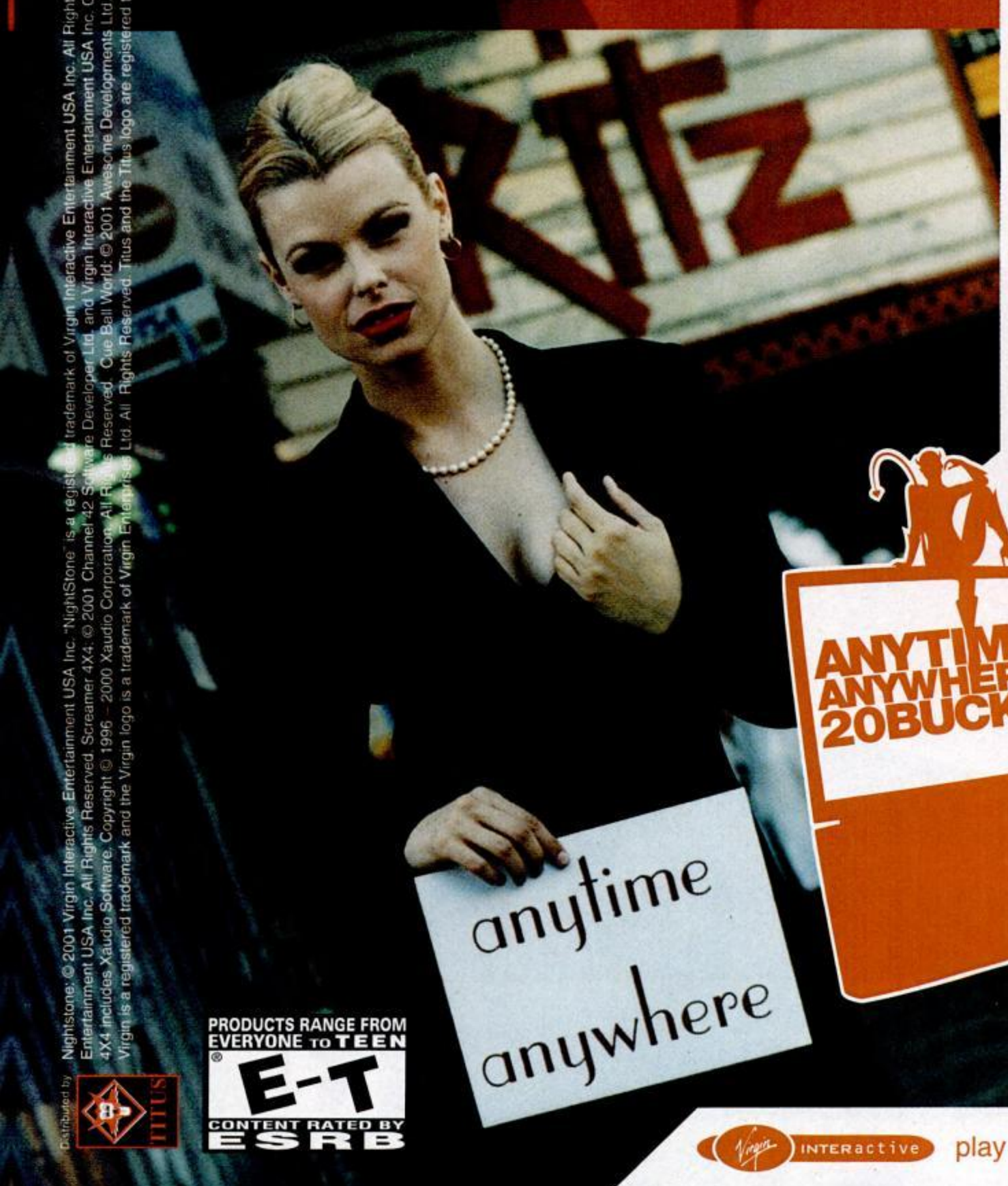
Screamer 4X4

:: 10 actual 4WD licensed vehicles to choose from.

:: Six different terrains, each with 10 courses to choose from.

:: Weather effects, coupled with different times of day

:: Five multi-player games with unique courses: Catch Up, Destruction, First to Point, King of the Hill and Off-Road Rally.



PRODUCTS RANGE FROM EVERYONE TO TEEN

E-T

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play games.

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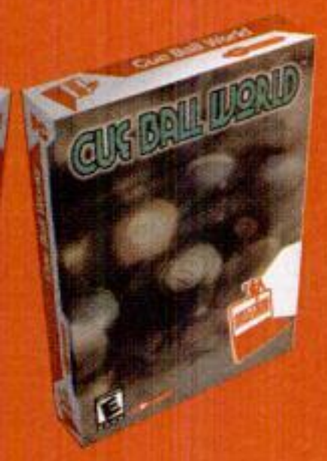
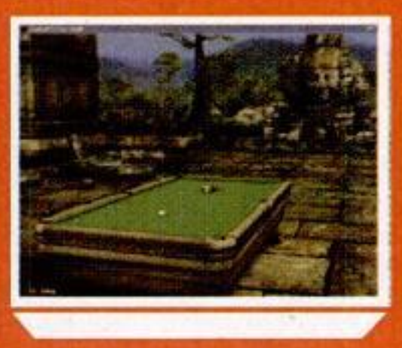
Original War

- Innovative, intuitive RTS with an intriguing storyline.
- RPG elements as the characters gain skill points for surviving sequential levels of play.
- Each team member has individual attributes, which makes him or her more valuable.
- Build your own unique team with individual personalities and abilities while harnessing elements from surrounding environments.
- Incredibly detailed graphics, fluid gameplay, and real 'line-of-sight' battles.
- Play as American Marines or Russian Soldiers in multiplayer mode.
- Battle with 5 players in the multi-player mode.

Cue Ball World

- Play snooker, pool and a host of minigames.
- World class ball physics that are just as accurate off the table as on.
- Eight different immersive real world environnments – all fully animated.
- A series of increasingly intelligent CPU player opponents.
- Four highly addictive sub-games (stunt tables, maze tables, darts, thumb wrestling).





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Head2Head

A showdown among natural competitors

THIS MONTH: PC vs. Xbox

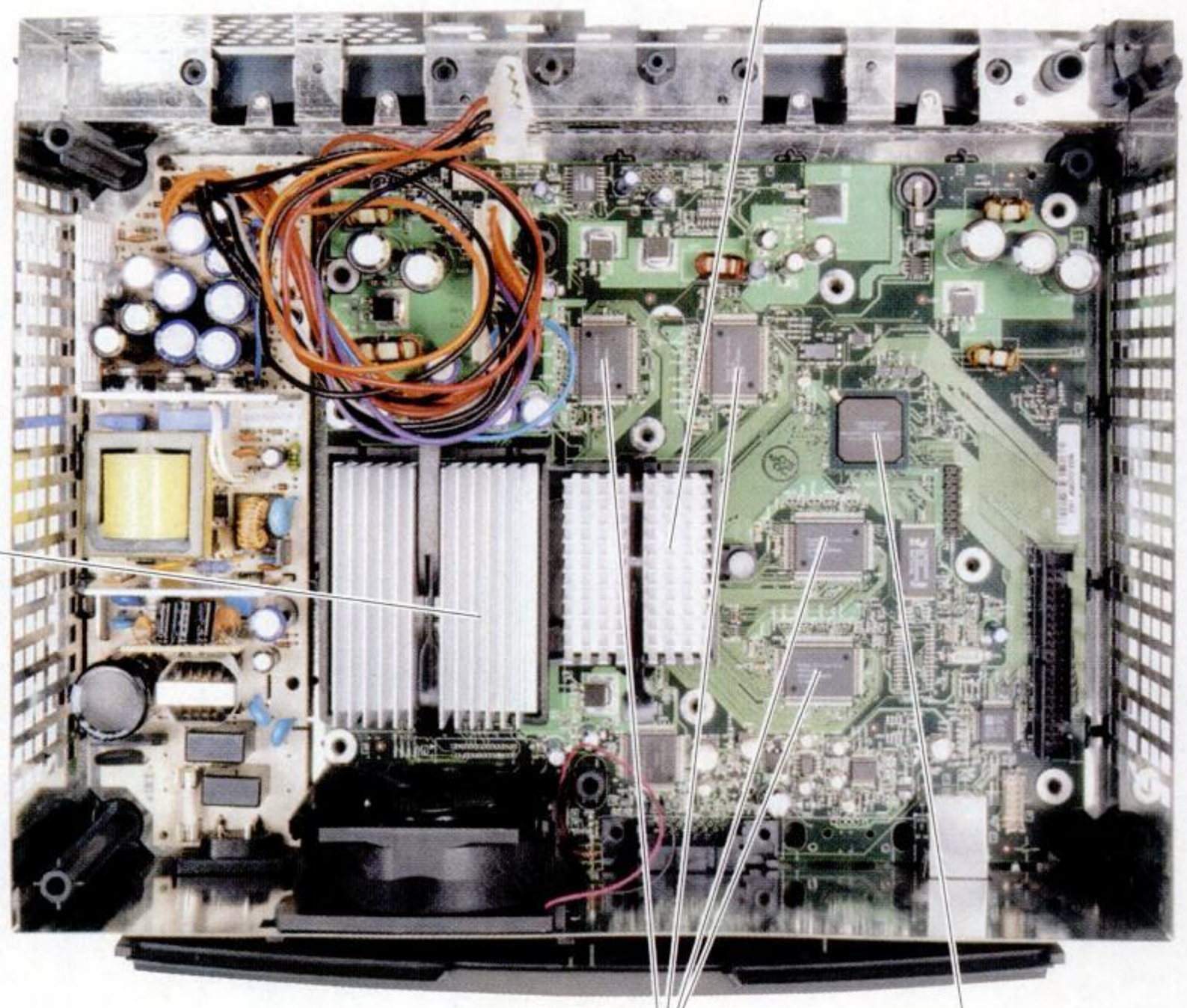
So your friends are ragging on you for playing *Return to Castle Wolfenstein* while they're noodling through *Dead or Alive 3* and *Halo* on their shiny new Xboxen? What they don't know is that their spiffy new $300 console is really just a circa-1999 PC with a hoity-toity GeForce3 chip. Here's all the ammo you'll need to lay the smack down on your trash-talking, console-playing pallies. For the purposes of this hardware showdown, we'll be comparing the Xbox to the Falcon Mach V, which received a Perfect 10 verdict in last month's issue and represents the current pinnacle of desktop PC technology.

—WILL SMITH

XBOX

Display: The Xbox is the first console to enable gaming at HDTV resolutions. What we're talking here, people, are resolutions as high as 1920x1080 (interlaced) in supported games. But of course, you don't own an HDTV, so you'll be playing Xbox on your low-res, 648x486, interlaced TV. Most PC power users haven't played 3D games at such a low resolution since 1997! **Winner: PC**

Graphics chipset: The incredible nVidia NV2x graphics processor is what makes the waves in *Dead or Alive 3* look so incredibly realistic and the particle effects in *Halo* so irresistible. Core speed is 250MHz, which is 10MHz faster than the PC version of the nearly identical GeForce3 architecture in the Falcon rig. **Winner: Xbox**



Storage: A 5x DVD-ROM drive (which accepts proprietary 4.7GB software DVDs) means no more disc swapping when playing even the longest RPGs. Meanwhile, an 8GB hard drive means you'll never run out of space on a memory card again. Nonetheless, these solutions pale under the PC's massive storage prowess. **Winner: PC**

CPU: "My Xbox has the fastest CPU around. Its 733MHz Pentium III is faster than the GameCube *and* the PS2." The bad news, Elroy, is that the last PC we saw with a 733MHz P-III came out in 1999! **Winner: PC**

Controller: The pleasantly lumpy Xbox controller is designed to fit everyone's hands, and it even includes handy breakaway cables so clutzy gamers don't rip the pad from its socket. Still, a mere gamepad can't cut it for first-person shooters and realtime strategy games. In fact, we doubt anyone will ever have fun playing FPSes on an Xbox. **Winner: PC**

Memory: A total of 64MB of 200MHz DDR memory is shared between the CPU and graphics processor. So eat it, Nintendo and Sony—you've been schooled. But while 64MB trumps the other consoles out there, it's still just *half* of what the cheapest PCs come with. **Winner: PC**

Core-logic chipset: A custom chipset from nVidia takes the 3D positional sound from Xbox games and encodes it to a Dolby Digital 5.1 stream suitable for playback through a home theater rig. It also provides an unbelievable 6.4GB/sec of bandwidth between the CPU and graphics processor. **Winner: Xbox**

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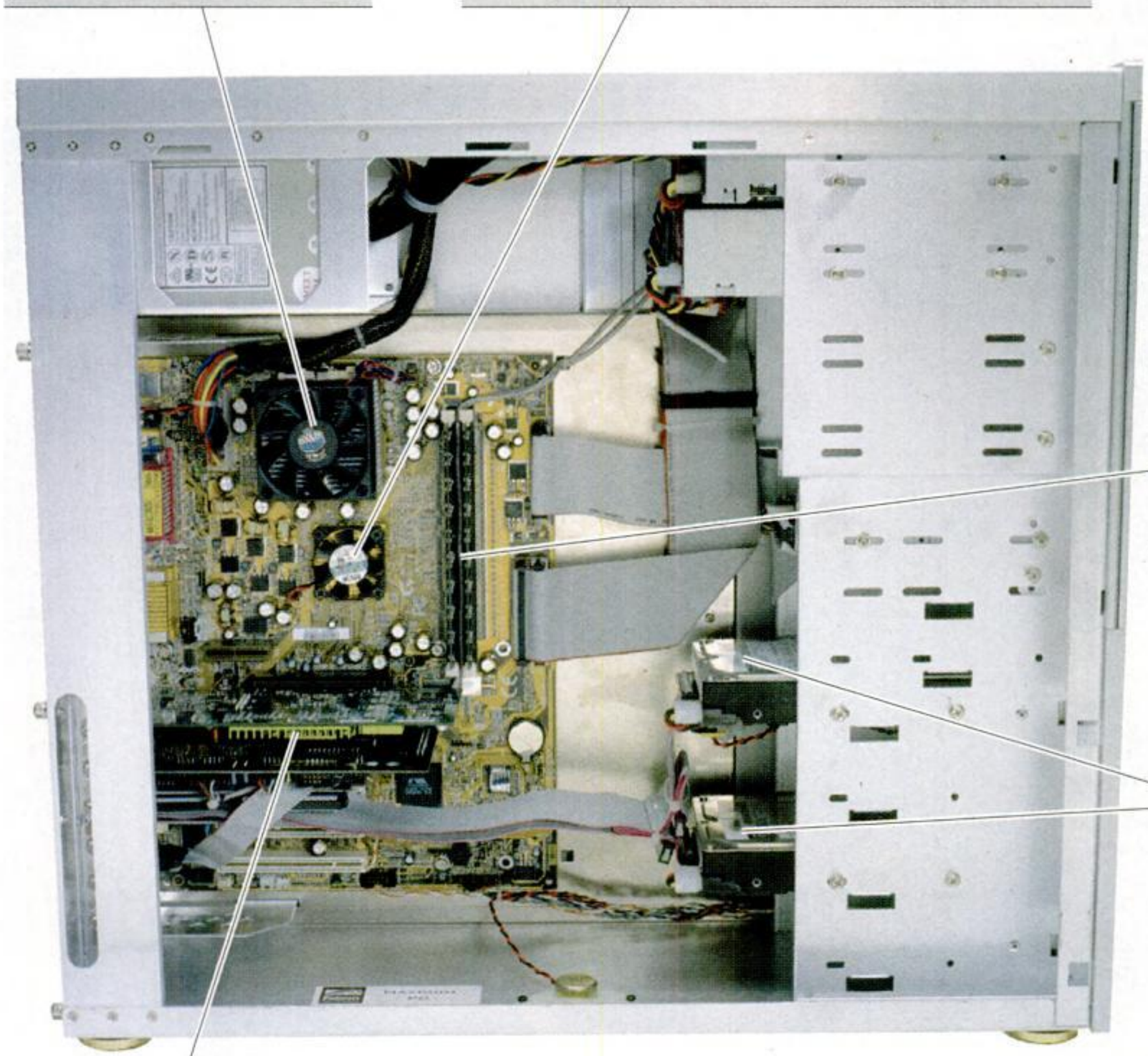
STATE-OF-THE-ART GAMING PC

CPU: HA-HA-HA-HA-HAH! A 733MHz processor is just about *1GHz* slower than the 1.5GHz Athlon nestled snugly in the PC's socket. **Winner: PC**

Chipset: An AMD 760 chipset harnesses PC2100 DDR RAM to give this Falcon PC 2.1GB/sec of bandwidth among the CPU, memory, and 3D accelerator. Nonetheless, even AMD's finest can't keep up with the bandwidth of nVidia's proprietary Xbox chipset. PC chipsets don't do the nifty Dolby Digital sound conversion either. **Winner: Xbox**



Controllers: We love gamepads for games like *Tony Hawk* and *Madden 2002,* but we wouldn't be caught dead playing any of our favorite FPSes with a gamepad. Which leads us to wonder if Xbox and PC *Halo* owners will be allowed to play against each other online—it just wouldn't be fair to the consolers unless the PC version cripples its players' keyboards somehow. **Winner: PC**

Memory: This PC has 512MB of PC2100 DDR memory on its mobo, plus 64MB of 250MHz DDR on the GeForce3 Ti 500. For those of you who aren't math whizzes, that's *nine times* as much memory as you'll find in an Xbox. **Winner: PC**

Storage: Any PC vendor who shipped us a machine with a miniscule 8GB hard drive would be laughed out of the Lab. In fact, we were a little disappointed this Falcon had just 80GB of total storage. **Winner: PC**

Graphics chipset: The GeForce3 Ti 500 in this system runs at 240MHz, which is just a hair slower than the Xbox's NV2x. The Ti 500 is closely coupled with 64MB of 250MHz DDR SDRAM, giving the GeForce3 8GB/sec of bandwidth—and this bandwidth channel connects the graphics chip to *dedicated* video memory; no shared memory resources here, Timmy. Nonetheless, the Xbox's NV2x's core is indeed 10MHz faster than the Ti 500's core. **Winner: Xbox**

Display: Unless you have an HDTV (and we know you don't), your Xbox experience will be relegated to low-res hell. And while 1920x1080 HDTV resolution sounds impressive, that resolution is *interlaced,* which means that only every other line is drawn each frame. Meanwhile, we were able to smoothly play *Max Payne* at 1280x1024 in 32-bit color on the Falcon. Life is wonderful—if you're a PC gamer. **Winner: PC**

THE UPSHOT

The Xbox is a great console box, but aside from its slightly more powerful 3D chipset and clever, sound-savvy core-logic chipset, it can barely even share a playing field with the best gaming PC. Of course, this whole article focuses on the hardware battle, which is clearly being won by the PC. If we brought the question of software libraries into the picture, the tables would quickly turn. Make no mistake: Microsoft's console supports a greater number of programmable shader games than you'll currently find on the PC. But when the DirectX 8 games for the PC *do* arrive, they'll look a hell of a lot better than the low-res Xbox versions playing in the majority of American living rooms. ■

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WatchDog

Maximum PC takes a bite out of bad gear

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

This 75GXP unexpectedly bit the dust.

Deskstar Lawsuit Latest

Last month, The Dog told you about a class-action lawsuit filed against IBM claiming that the company's famed 75GXP hard drives are unreliable and have not lived up to consumer expectations. Big Blue has yet to respond to the suit, and a spokeswoman for the company says she cannot comment on it because of the pending litigation. (It's typical in the early phases of litigation for involved parties to refrain from comment until a course of action is known.) Also keeping quiet on the subject is attorney Jonathan Shub, one of the attorneys who filed suit against IBM on behalf of plaintiff and *Maximum PC* reader Michael T. Granito. Readers may recognize Shub's name from his participation in the suits against Kenwood Technology, for its 40x40 CD-ROM drive, and Philips, for an allegedly defective CD-R drive. Though Shub isn't talking, what information is available about the lawsuit can be found at the web site for Shub's law firm: www.sheller.com/ibmclassaction.htm.

Since last month's article appeared, readers have written The Dog with more complaints about the drive. Reader Michael Mappin says his store sold the 75GXP for about a month and encountered 15 failures. Mappin himself claims to have replaced his own 75GXP no fewer than five times, and his co-worker had a 75GXP fail twice. "I'm totally sure this is way above normal," Mappin writes.

"The suit may take months or even years to complete; in the meantime, a faulty drive serves no purpose."

The dilemma readers face is whether to RMA a faulty drive or hold onto the drive while the suit winds its way through the legal system. The suit may take months or even years to complete; in the meantime, a faulty drive serves no purpose. Readers should also bear in mind that the suit seeks just the value of the drive, not reparations for lost data or time. With that in mind, The Dog recommends that readers RMA faulty drives now, but also keep a copy of the receipt, serial number, and model number of a defective drive as proof of ownership.

Viking Computers Plundered

DEAR DOG: I recently purchased equipment from VikingComputers.net because the company's web site says "all orders placed before 3 p.m. are shipped the same day." Well, the product was never sent, and I haven't been able to reach anybody at the company. The voicemail system is full, and even American Express and UPS are unable to reach a human at the company. I wish I could say I had a bad experience, but the truth is, I had no experience. I am convinced this company is simply a server set up in someone's basement sending out automated e-mails and shipping information.

— SCOTT KIDBY

THE DOG RESPONDS: It's not clear what the story is with VikingComputers.net, but The Dog also failed to get a response to e-mail and phone calls directed at several of the company's departments. Long vacation, perhaps? For *everyone*? While it seems the company is DOA, the Dallas chapter of the Better Business Bureau considers Viking Computers, aka ANH Micro, in good standing. "Our file experience shows that this company has a satisfactory record with the Bureau. The company has been responsive to any complaints brought to its attention by the Bureau," says the Dallas BBB. Viking Computer is a member of the BBB and has apparently been operating since 1995.

No matter what the BBB says, The Dog regards Viking Computer's customer service to be far less than satisfactory. Until the company can explain its status to the public, consider VikingComputer.net in the Dog House and its products off limits. Woof.

Not Dead

Not all news is bad news. Reader James Bothe sends word that a company thought to be dead has apparently clawed its way back to life.

DEAR DOG: I noticed an article in Watch Dog [June 201] that said Razor was dead. And indeed it was, but the company is back now and mad as hell. Check it out at **www.razerzone.com.** Long live the boomslang!

— JAMES B.

Maxtor Switcheroo

DEAR DOG: I recently purchased a Maxtor DiamondMax 40GB hard drive from an online store. When I opened the box, I found a Quantum hard drive! Maxtor and Quantum merged, and it looks like Maxtor is getting rid of Quantum hard drives by putting them in the Maxtor hard-drive kits. I think this is wrong, and I'm going to call Maxtor and request that I be sent the hard drive listed on the box and that I intended to buy, a Maxtor DiamondMax 40GB. Please alert your readers and ask Maxtor if it will exchange the Quantum for a Maxtor hard drive.

— PHILIP POHL

THE DOG RESPONDS: Indeed. Several readers have barked that Maxtor retail-boxed hard drives may contain drives actually made by Quantum. The Dog contacted Jim Welsh, a Maxtor VP who had this to say about the situation:

"First of all, thank you for your dedication to Maxtor drives.

"On the Maxtor/Quantum HDD merger, you're absolutely right. We merged with [Quantum] and now own its property, products, and inventory. Please keep in mind that Quantum DLT, the tape company, still exists, so we are not allowed to put any marketing message on the outside of our box. However, we do put a note inside the box stating that customers may receive a Quantum hard drive.

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Consumer Advocate

Look below the Cisco logo for the model number of defective power adapters.

"All Maxtor policies and warranties apply to the Quantum labeled drive. In the future, if you want a Maxtor labeled product you should look at the UPC label to find the serial number of the drive. If the serial number is eight digits and alpha-numeric, the drive is a Maxtor labeled product.

"As close competitors for many years, we feel Quantum drives are just as reliable and can even be better (acoustically) than our own Maxtor drives. In fact, some retail Quantum drives contain the latest acoustic technology featuring a new fluid bearing motor, which makes them the quietest drives available in retail (until the fluid bearing DiamondMax Plus D540X hits the streets later this quarter)."

Welsh says Maxtor would be happy to exchange Pohl's Quantum drive for a Maxtor unit, and suggests he call Maxtor's support line. Is it aboveboard to sell Quantum HDs in Maxtor boxes? No, but in these days of terrible tech service, Maxtor's response is stand-up.

THE DOG RESPONDS: Kevin isn't the only reader to report issues with Compaq's support of the Pioneer DVD-RW drive. Other readers have informed me that firmware updates for the drive have mysteriously vanished from Compaq's site, with no word from the company as to whether it will offer the firmware in the future. The Dog contacted a Compaq spokeswoman who says the page has been temporarily taken down while Compaq reworks the instructions for installing the firmware. She promises that Compaq will have the page back up by the time you read this column. In the meantime, there may be an alternative. While the Compaq manual indicates that firmware is needed for the Pioneer drive to support writing to DVD-RW, *Maximum PC*'s very own Doctor says the drive doesn't need firmware to write to DVD-RW discs, after all. In fact, all that's needed is newer software. The latest copy of *Nero 5.5*, for example, will write to a DVD-RW drive without a problem.

"Readers have informed me that firmware updates for the drive have mysteriously vanished from Compaq's site...."

Compaq DVD-RW Troubles

DEAR DOG: I purchased a Compaq Presario 7000, based on *Maximum PC*'s review. Overall, it works great; however, I got the dual DVD-RW/CD-RW drive (Pioneer 103), and it did not come with any software that allows me to back up data to a DVD drive. That was kinda the point of getting it. The paperwork I received with the PC says this software is coming and to check a web page for it. That was three months ago. The web page no longer exists. I keep calling customer support and they say they have no idea about the software. My e-mail requests get replies telling me to call customer support. This drive isn't exactly useful without software.

— KEVIN MENARD

Cisco Recalls Hot DSL Adapters

Cisco Systems has recalled power adapters sold with its Cisco 826, 827, 827-4V, and SOHO 77 ADSL routers because the adapters may overheat, start fires, or shock people. The company sold about 95,000 of the ADSL modems that use the adapters. The company says that one adapter overheated; there are no reports yet of injuries or property damage from overheating adapters. The recall does not affect the modem nor the power cord that shipped with it. If you have one of the above models, look at the back of the AC adapter. Below the Cisco Systems logo, you should see a series of numbers; if you see "P/N: 34-0949-02," your adapter is on the recall list. Anyone who has the adapter should immediately turn off the modem, unplug the power adapter from the wall, and contact Cisco for a replacement at 800.553.2447 or 408.526.7209. ■

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SPEED

We benchmark the living daylights out of a lab full of hardware to name the fastest PC technologies, once and for all. Oh, what an interesting story the test results tell!

In today's world of 2GHz CPUs, dual-channel DDR memory, and gigapixel videocards, it's way too easy to get caught up in a game of "specsmanship," a trivial pursuit in which buzzwords and unsubstantiated claims take precedence over actual performance. So we decided to toss aside all the "probablies" and "most likelies" to find out which PC technologies truly offer the best performance.

What's faster? Rambus's controversial RDRAM or the more "populist" DDR?

How much of a difference does symmetric multiprocessing really make?

How much hard drive performance can you legitimately expect from a RAID array?

That's right, you hardcore upgrading freaks: You won't find any wimpy benchmark runs in this round of speed trials!

Some of the benchmark runs were born of reader suggestions. Others answer questions we've been asking ourselves for months. We did our absolute best to respect the scientific method and isolate specific technologies in each speed trial. In simple terms, that means we did our best to create "apples-to-apples" comparisons. Unfortunately, time and "hardware acquisition" problems did put the kibosh on some of our grander plans.

In each speed trial, we explicitly note the hardware tested and the benchmarks run. If you'd like more information about our benchmarks and what exactly they measure, please go to the Benchmarking Guide in the "mag reprints" section of MaximumPC.com. To keep pace with the modern world, we ran our tests in Windows XP Professional unless otherwise noted.

Ready for the answers to your most burning questions? Excellent. We're ready to oblige. Just don't forget to read page 36, where we reveal what we'd build today if we were asked to combine the ultimate technologies in a single, no-excuses desktop PC.

WHOOMPH! (That was the sound of the PC to the right lifting off into the stratosphere.)

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TRIALS

BY GORDON MAH UNG & WILL SMITH

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1 Are RAID arrays really that much faster than single hard drives?

METHODOLOGY: Everyone knows that 7200rpm hard drives are the only way to go for fast desktop storage, but what happens when you take two or more of those fast drives and stripe or mirror them using a RAID array?

RAID stands for "redundant array of inexpensive disks." By hooking multiple drives to a RAID controller, you can "mirror" the drives to ensure your data will be safe in the event of a disk failure, or "stripe" the drives to increase overall drive capacity and speed. You can even mirror *and* stripe disks for the best of both worlds.

To test RAID speed dividends, we installed a Promise FastTrak IDE RAID controller in our standard test bed and loaded the rig with Windows XP Home. We then ran our *HD Tach* benchmark under various RAID scenarios using up to four 120GB Western Digital 1200BB hard drives. Each ATA/100 drive spins at 7200rpm and boasts 2MB of cache. We tested average read and write performance for each RAID scenario.

RESULTS: A striped array can provide significantly faster write speeds. When we ditched our single drive for a two-drive striped array, we saw about a 20 percent performance increase. Moving to four striped drives, we saw about a 34 percent increase. However, these write speeds came at the cost of read speeds, which plummeted by as much as 30 percent with a four-drive striped array in our testing.

Mirroring showed an inverse effect. Using a two-drive mirror, we measured a massive 20 percent writing penalty. Why? Probably because the same data had to be written to two drives instead of one! Luckily, in this test, there was virtually no difference in read speeds when compared with a single drive. Our four-drive striped/mirrored array demonstrated the same approximate 20 percent writing hit of the two-drive mirror, and suffered just a negligible 4 percent performance hit on reads.

The upshot: If you're doing lots of writes, then stripe as many drives together as possible. (You need to care about writes if you frequently work with large media files.) However, if you want the fastest reads, grab the fastest hard drive you can find and use it by itself. (You need to care about reads if you want to speed application and document load times and level changes in 3D games.) And if you're concerned only about speed, avoid mirrored RAID arrays like the plague. They're for people who are obsessed with the possibility of mechanical drive failure.

	HD TACH READS	HD TACH WRITES
1 Drive	40.3MB/sec	23.9MB/sec
2 Drives - Striped	39.0MB/sec	28.7MB/sec
4 Drives - Striped	27.2MB/sec	32.0MB/sec
2 Drives - Mirrored	40.1MB/sec	19.0MB/sec
4 Drives - Striped + Mirrored	38.8MB/sec	19.1MB/sec

2 Is ATA/133 really any faster than ATA/100?

METHODOLOGY: Like its name implies, ATA/133 increases the speed ceiling of IDE devices from 100MB/sec to 133MB/sec. But does the extra headroom really pay off during real-world use? To find out, we ran comparative benchmarks on two configs. The first config included an 80GB, 7200rpm Maxtor D740X ATA/133 hard drive attached to a Promise ATA/133 PCI controller card, 256MB of PC800 RDRAM, and a 2GHz Pentium 4. The second config was identical, but we attached the Maxtor drive to a Promise ATA/100 PCI controller card instead.

Please note that when running an ATA/133 drive on an ATA/100 bus, the throughput ceiling simply drops down to ATA/100 without any extra punitive damage—or so states every hard drive vendor we've ever talked to. And if you're wondering why we used an ATA/100 PCI controller card instead of the mobo's onboard ATA/100 controller, it's because we wanted both interfaces to compete on a level playing field.

Our benchmarks included the burst test in *HDTach 2.61*, which gauges the throughput rate when a drive's buffer is flooding the ATA bus, and SiSoft *Sandra 2001*'s higher-level drive benchmark, which tallies average reads and effectively removes bursts from the equation. To test ATA's impact on real-world apps, we used Sonic Foundry *Sound Forge 5.0D* to open a 500MB audio file. All tests were conducted on a clean install of Windows XP Professional, and we reformatted the hard drive between moving it from ATA/133 to ATA/100.

RESULTS: If you're looking for pure burst speed—which, for example, comes into play when launching applications—then the benefits of a higher throughput ceiling are clear. In *HDTach*, ATA/133 belted out 20 percent more throughput (17MB/sec) than ATA/100. Of course, actual burst speeds never reach the promise of the ATA spec. After dealing with the overhead of error correction and bus congestion, ATA/133 actually tops out at about 100MB/sec, while ATA/100 hits 85MB/sec. (ATA/66 is lucky to hit 56MB/sec.)

Now, all of that is the *good* news. The bad news—and this should come as no surprise to power users—is that hard drives are still limited by the intrinsic speed of their own mechanics during regular reads and writes, and rarely hit throughput ceilings during typical activity. Dig the SiSoft *Sandra* score, and notice that ATA/133 offered just an 8 percent speed dividend in our *Sound Forge* test. Bottom line: ATA/133 will help you only during bursts and when reading long contiguous files from your hard drive.

	ATA/100	ATA/133
HD Tach Burst	85.0MB/sec	102.0MB/sec
SiSoft Sandra 2001 HD	27.0MB/sec	27.6MB/sec
Sound Forge 5.0D Open File	35.6 sec	32.9 sec

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3 How much faster are two CPUs compared with just one?

METHODOLOGY: PC power users have been running dual-proc systems for years—but the trade-offs have always been painful. DirectX gaming support was spotty under Windows NT, and Windows 2000 videocard drivers were downright bad. With Windows XP Professional, however, dual processor configurations—also known as symmetric multiprocessing, or SMP—may finally become mainstream.

To gauge the real-world benefits of SMP, we configured a PC with two 933MHz Coppermine Pentium III CPUs in an Intel OR840 "OutRigger" motherboard. We fitted two 256MB PC800 Kingston RDRAM modules into each of the mobo's dual-channel RDRAM slots. A single IBM 75GXP fed the rig, and a reference GeForce2 Ultra running the 21.83 Detonator 4 driver handled video chores. Our OS was WinXP Professional (SMP support isn't available in WinXP Home). Why no dual Pentium 4 CPUs, you ask? Because Intel has intentionally left SMP support out of the P4. It must be noted that Intel says the P4 can do SMP, but the company just hasn't added SMP support to P4 chipsets. For now, dual P4 action is left to its sibling, the Xeon.

Our benchmarks included the content creation portion of *SYSmark2001*, which includes a number of multi-threaded apps (that is, apps specifically coded to take advantage of SMP). We intentionally ignored the office productivity portion of the suite because office apps hardly stress today's CPUs. Also in the mix was Newtek's *Inspire3D*. This consumer-level 3D rendering app is based on the *Lightwave* professional product and is multi-threaded. We ran the SiSoft *Sandra 2001* CPU benchmark too, which can also test two processors. To gauge SMP's impact on gaming, we pulled out *Quake III Arena*, which is one of the few games with dual-proc support. Our standard *Photoshop 6.0.2*, *Premiere 6.0*, and *MusicMatch* MP3 encoding test rounded out the benchmarks. The two Adobe apps employ multi-threading in some of their filters. *MusicMatch* boasts no multithreading and was included as a control.

We conducted all the tests with both CPUs, then physically removed one of the CPUs and ran the benchmarks again.

RESULTS: Our numbers show there are indeed times when two is better than one. And there are also times when a second CPU is a complete waste of cash. In *Inspire3D* and the synthetic SiSoft *Sandra* test, we saw nearly double the performance when using two procs. That came as no surprise, as both are designed to take full advantage of two procs. These tests illustrate best-case scenarios for SMP use.

But we were shocked by the performance bump we saw in Adobe *Premiere 6.0*. The 5.1 version of *Premiere* was notorious for failing to leverage its own SMP support. In our speed trial, however, we were able to shave almost a *third* off the time it took to render our sample video. We must note that what you actually do in *Premiere* has a big bearing on whether SMP will pay off in speed dividends. Our action script adds titles and transitions to an AVI stream before rendering it to a Windows Media Format video. These actions are apparently fools for dual-proc loving.

Adobe *Photoshop 6.0* was less friendly. We saw nary a difference between SMP and single-proc modes. Very few features available in *Photoshop* are multi-threaded, which suggests that Apple is cooking its benchmarks very carefully when showing off the prowess of its multiprocessor machines. Overall, we're willing to state that you just don't need SMP for most of the *Photoshop* work you'll ever do. The app just isn't all that multi-threaded.

In *Quake III*, we also found SMP support to be spotty at best. This is no surprise, as some people can't even get the game to run in SMP configs. We actually saw performance *decrease* when we turned on the dual-proc support. Of course, most of today's apps are like *MusicMatch*, which we used to encode an MP3 file. *MusicMatch* takes absolutely no advantage of a second CPU.

The last test we ran, *SYSmark2001* content creation, gave us surprisingly good results. Part of the SMP success can be attributed to the fact that the benchmark suite makes good use of multi-threading in apps such as *Windows Media Encoder* and Adobe *Premiere*. But we think the suite's new multi-tasking strategy also came into play. Unlike *SYSmark2000*, the latest version of *SYSmark* actually runs up to three applications simultaneously when running its script. So when running *SYSmark2001* on a dual-proc machine, one CPU can crunch one app, while the other CPU crunches another app, and thus CPU resources are effectively doubled (or at least they are when the SMP-enabled operating system is balancing resources with maximum efficiency). The beauty is that these benefits don't require your apps to be coded for multi-threading.

In real-life terms, this means that people who simultaneously download multiple MP3s, edit large image files, play music, type articles, and browse the web should benefit from two CPUs (hey, sounds like most *Maximum PC* editors!). Just remember that a dual-1GHz system won't be as fast as a single 2GHz system: We've generally found that a 2GHz Pentium 4 trumps dual P-IIIs in all but the most "P4-antagonistic" benchmarks.

If you're a gamer and rarely multitask, stick to the single fastest CPU you can get. But if you're constantly running multiple apps, the dual CPUs may be for you.

	ONE P-III	TWO P-IIIs
SYSmark2001 CC	108	**155**
Quake III Demo 1	**109.6fps**	106.9fps
Inspire 3D	234 sec	**124 sec**
Photoshop 6.0.2	101 sec	**94 sec**
Premiere 6.0	290 sec	**213 sec**
SiSoft Sandra 2001 CPU	2474	**5005**
MusicMatch 6.0	396	**392 sec**

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4 Do SSE instructions even matter?

METHODOLOGY: When a CPU company comes out with a special instruction set like SSE (streaming single instruction, multiple data extensions), it likes to brag about how much extra performance the set provides—and encourages software developers to use the new code. But how much firepower does the extra code really offer? Does it really behoove developers to get with the program?

AMD's recent move to support Intel's SSE instructions helped us reach some answers. AMD recently complained to Microsoft that its *Windows Media Encoder* program doesn't take advantage of the AMD Athlon's new SSE support. Apparently, the software checks to see whether it's running on an Intel CPU or an AMD CPU, and enables SSE only if an Intel CPU is identified. Of course, the software should check for the presence of SSE support, not for an Intel CPU pedigree.

Well, AMD has convinced Microsoft to approve a *Windows Media Encoder* patch for the Athlon. Because *Windows Media Encoder* is included in the content creation portion of *SYSmark2001*, we decided to run the benchmark with and without the AMD/SSE patch to see if performance varied. Our test rig included a 1.53GHz Athlon XP, 256MB of PC2100, a GeForce 3 with the 21.83 Detonator 4 drivers, and an IBM 60GXP hard drive.

RESULTS: SSE does make a tremendous difference—at least in *Windows Media Encoder*. With the patch installed, the content creation score jumped from 174 to 202. That's a huge improvement, considering the content creation score is actually a cumulative score based on the cumulative performance of five apps (the other four are Adobe *Photoshop 6.0* and *Premiere 6.0*, and Macromedia *Dreamweaver 4* and *Flash 5*). We'll be the first to admit that this speed trial isn't a definitive referendum on SSE and similar instruction sets, but we thought you'd be interested in knowing these interesting results.

Final note: The AMD faithful have been rumbling that all journalists should begin using the patch—despite the fact that it would make it difficult to compare *SYSmark2001* test runs conducted before and after the patch was introduced. Meanwhile, Intel proponents could also argue that the version of *Photoshop* used in *SYSmark2001* should be patched to support SSE2. In the end, the creators of *SYSmark2001* have directed those who publish official scores not to patch the program in any way. We're following their advice.

	SSE ON	SSE OFF
SYSmark 2001 CC	202	174

5 Can one ever have too much RAM in WinXP?

METHODOLOGY: With memory prices at a record low, the question isn't whether to run 128MB or 256MB, but rather whether 512MB or 1GB provide any extra oomph. We tackled this question in a December 2000 Lab Notes story, but thought it would be illuminating to run some benchmarks again to determine RAM needs in Windows XP.

We essentially built a single test bed, then conducted four different benchmark runs with 128MB, 256MB, 512MB, and 1GB of PC800 RDRAM. The test bed included an Intel D850MD motherboard, a 2GHz Pentium 4, a WinFast GeForce3 coupled with nVidia's 21.83 Detonator 4 drivers, a single IBM 60GXP, and Windows XP Professional. After we finished all benchmarks with 128MB, we added another 128MB, ran the benchmarks again, and so on and so on, until we hit 1GB of RAM.

Our benchmarks consisted of the content creation portion of *SYSmark2001*, our own *Quake III* test, and Adobe *Photoshop 6.0*. We really wanted to stress the hell out of *Photoshop*'s memory load, so we took our standard 8MB image file and doubled the resolution (to hit 35MB) before running our standard, Lab-brewed action script.

RESULTS: Swat our asses and call us Betsy! We surely expected to see greater variance among all the *SYSmark2001* scores. We know this multitasking benchmark suite hits the hard drive for virtual memory, so we assumed that adding buckets of RAM would significantly improve performance. Well, now we know differently. Rest assured, if we ever see curious *SYSmark2001* scores during future system review testing, we'll be reluctant to blame low memory amounts on the anomaly.

Quake III told us an interesting story, indeed—you better have enough memory to placate the game demo's large, high-res textures, as well as some headroom for WinXP's greedy memory appetite. If you're running just 128MB, give up and go home. But 256MB is all that's really required to feed the needy. The *Photoshop* test demonstrated RAM gluttony at its worst—you just can't give this app enough memory when working on large files. It just keeps on eating the stuff, without so much as a thank you.

If you're running WinXP, 256MB is your minimum and 512MB is your sweet spot. If you're into still image, video, or audio content creation—or anything else that has you working with gigunda files sizes—go for broke.

	128MB	256MB	512MB	1GB
SYSmark2001 CC	204	204	208	208
Quake III MPC	14fps	82fps	84fps	84fps
SiSoft Sandra 2001 RAM	1429	1365	1358	1350
Photoshop 6.0.2 (large File)	WNR	343 sec	298 sec	241 sec

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6 What's the fastest Pentium 4 memory type: RDRAM, DDR, or PC133?

METHODOLOGY: In an ideal world, we'd run this speed trial with a single motherboard that supports all three memory types. That way, memory performance would be completely isolated, and we wouldn't have to worry about variables such as chipset performance and the vagaries of PCB layouts and circuit lengths. The problem is, no P4 motherboard comes with slots for all three memory types, and even if some boards did offer support for more than one memory type, they would have to resort to the use of memory translators. Translator tomfoolery ultimately punishes the performance of at least one of the memory types, so we didn't want to go this route. The solution was to run this speed trial with four separate mobos (one mobo each for RDRAM and PC133, and two mobos for DDR). So, in the end, this is really a showdown among memory/chipset/mobo combos. That stated, we're confident we'll be able to glean much insight about memory performance from the results.

Because Intel is the only manufacturer of RDRAM chipsets (SiS's RDRAM chipset wasn't available at press time), we selected the **Intel 850 chipset sitting atop an Intel D850MD "Maryland" motherboard** to carry the RDRAM banner. Featuring two RDRAM channels—good for 3.2GB/sec of theoretical bandwidth—the 850 has been the performance Pentium 4 chipset since the P4's introduction. For this speed trial, we used two 128MB PC800 RIMMs from Kingston.

Representing PC133 memory was the **Intel 845 chipset sitting atop an Asus P4B mobo**. Perhaps the best PC133 Pentium 4 motherboard around, the P4B was configured with two 128MB PC133 CL2 memory modules from Crucial Technology.

On the DDR front, our first contender was a **Shuttle AV40/R mobo using the P4X266 chipset**, VIA's unauthorized DDR offering for Pentium 4 (Intel and VIA are locked in a legal tussle over whether VIA even has a right to build P4 chipsets). We locked in a single 256MB, CL2, PC2100 DIMM from Crucial Technology.

Intel isn't supposed to release its own DDR Pentium 4 chipset until early 2002, but we pulled a fast one and obtained an **ultra-secret motherboard that uses Intel's upcoming 845D chipset**. Featuring support for both 200MHz and 266MHz DDR SDRAM, we populated the board with the same 256MB Crucial module used in the VIA-based DDR mobo.

As for the remaining hardware, all four of the test rigs were identical. We used a Leadtek GeForce3 videocard with 21.83 Detonator 4 drivers and identical IBM 60GXP hard drives. We disabled onboard audio and RAID controllers, ran fresh installs of WinXP Professional, and grabbed the latest drivers and BIOS updates for each motherboard. All tests were conducted with identical 2GHz Socket 478 Pentium 4 CPUs. All four frontside bus speeds were identical: 100MHz, quad-pumped.

Our benchmarks featured the usual suspects: the content creation portion of *SYSmark2001*, *Maximum PC*'s own in-house *Quake III* demo, our standard in-house Adobe *Premiere 6.0* rendering test, and *MusicMatch* to test high-quality MP3 encoding. We also selected the synthetic SiSoft *Sandra 2001* RAM benchmark (for its ability to measure memory bandwidth in best-case scenarios) as well as *Sandra 2001's* CPU/Dhrystone benchmark. As Intel likes to note, even the creator of Dhrystone has said the test offers nominal value in measuring the performance of modern CPUs. This makes it a dubious benchmark when comparing two *opposing* CPU architectures like Athlon XP and Pentium 4. But the test can provide some insight when comparing different mobo/chipset/memory combos based on the same CPU platform.

We also included our old Adobe *Photoshop* action script, as well as the overall *3DMark2001* test.

RESULTS: Even a cursory glance at the benchmark chart will show you that RDRAM easily defeats PC133 SDRAM. This should be no surprise: 133MHz memory just can't keep the Pentium 4's 400MHz bus stoked with enough material to chew on. The result was an almost across-the-board performance hit. The only benchmarks in which the PC133/845 combo *didn't* significantly lag were the SiSoft *Sandra* CPU and *MusicMatch* tests. In fact, the similarity of all four SiSoft *Sandra* CPU scores tells us that if all your applications isolate the CPU and never hit main system memory or your hard drive, you'll get similar performance, mobo/chipset/memory combos notwithstanding.

The DDR/VIA combo turned in very respectable performance. In fact, in our benchmarks, it generally represented a middle ground between the RDRAM/850 and the PC133/845 combos. The surprise came from Intel's own DDR/845D combo, which is scheduled for release in early January. The conventional wisdom has always been that Intel is sandbagging DDR in order to protect the adoption of RDRAM. That may well be true, because Intel's long-overdue take on DDR looks to be a serious threat to RDRAM and could spell the end of the controversial memory type. The DDR/845D combo's *SYSmark2001* score matched that of the RDRAM/850 combo, and beat RDRAM/850 in *MusicMatch*, *Premiere*, *Photoshop*, and SiSoft *Sandra CPU*.

RDRAM/850's superior bandwidth gave it an easy win in the synthetic SiSoft *Sandra* memory bandwidth test, as well as *3DMark2001*. In applications that truly need the bandwidth, such as *Quake III*, RDRAM/850 still has an edge (and, as the scores indicate, PC133/845 still has a handicap). We should also note that OEMs who've tested Northwood, the next iteration of P4, say the upcoming CPU's higher speeds and increased L2 cache size give RDRAM/850 a speed advantage over DDR. That advantage may be dulled, however, when Intel's DDR platform supports DDR333, the looming high-speed update to PC2100.

	RDRAM	PC133	VIA DDR	INTEL DDR
SYSmark2001 CC	204	184	195	**205**
Quake III MPC	**83fps**	76fps	80fps	82fps
3DMark2001	**6998**	6146	6426	6765
Photoshop 6.0.2	73 sec	76 sec	73 sec	**71 sec**
Premiere 6.0	209 sec	221 sec	214 sec	**207 sec**
SiSoft Sandra 2001 RAM	**1365**	657	967	985
SiSoft Sandra 2001 CPU	3869	3865	3830	**3998**
MusicMatch 6.0	206 sec	211 sec	210 sec	**203 sec**

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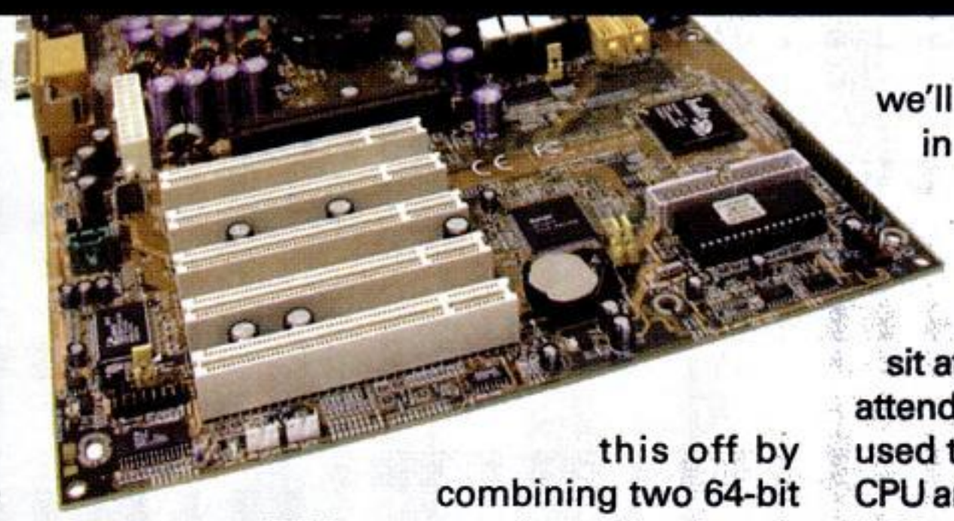
7 What is the fastest Athlon DDR chipset?



METHODOLOGY: If you've already read our Pentium 4 chipset shootout, you know that it's difficult to state that RDRAM is faster than PC133 without going through a litany of qualifiers. Indeed, when it comes to gauging the relative performance of various memory types, you must always factor core-logic chipset performance into the equation as well. Nowhere is this more apparent than on the AMD Athlon platform, where you have just one type of RAM—PC2100 DDR SDRAM—supported by many different chipsets. Historically, we've found that performance fluctuates wildly from Athlon DDR chipset to Athlon DDR chipset, suggesting that memory is only part of the motherboard speed equation. So the essential question remains: What is the fastest Athlon DDR chipset?

The reigning speed champ has long been **AMD's own 760 chipset.** To represent the 760 in our Athlon DDR chipset speed trials, we used a Gigabyte GA-7DX Rev. 4.0 motherboard. This mobo—like many AMD 760-based mobos—actually employs a VIA 686B southbridge chip to control such low-level functions as USB and IDE drive support. See the end of this speed trial for a brief peak at how the southbridge chip may affect performance.

The three other mobo/chipset contenders were:

■ Soyo's brand-new SY-K7V Dragon Plus! This motherboard uses **VIA's KT-266A DDR chipset**, which is the company's follow-up to the KT266. It's sometimes said that it takes VIA "two tries" to get its chipsets in fighting shape, and that it's usually worth waiting for the "A" version of any of the company's core-logic offerings. Besides offering DDR support, the KT266 chipset uses VIA's "Vlink" architecture, which does away with traditional north and southbridge distinctions, and uses a special 266MB/sec high-speed interface to connect PCI slots, IDE drives, and other peripherals with the CPU and memory.

■ The third contender was nVidia's much-hyped **nForce 420 chipset**, sitting atop a reference motherboard supplied by nVidia. The nForce 420 reuses portions of the technology nVidia developed for Microsoft's Xbox. The chipset offers GeForce2-level integrated graphics, realtime encoding of surround sound, and a pre-processor that predicts CPU requests. It also uses AMD's 12.8GB/sec HyperTransport technology to connect the CPU and memory with the IDE drives, PCI slots, and such. But the nForce 420's most exciting feature may be its use of 128-bit DDR memory. The chipset pulls this off by combining two 64-bit DDR memory channels; the rub is that you must fill two of three DIMM slots to achieve 128-bit transfers.

To keep this speed trial kosher for all four chipset/mobo contenders, we ditched the nForce's onboard video for our own WinFast GeForce3 videocard. Also, while the other three mobo/chipset combos were tested with a single 256MB PC2100 memory module, the nForce's architectural requirements demanded we use two 128MB PC2100 modules. To ensure that the use of two 128MB sticks wasn't giving the nForce either an advantage or disadvantage, we tested the memory in another DDR motherboard and found no performance difference when compared to the use of a single 256MB stick.

■ Our final contender is a hot-off-the-presses Iwill XP333-R mobo using **ALi's MAGiK 1 chipset.** An earlier version of the chipset was the first Athlon DDR chipset available, and ALi says the latest revision makes up for the lackluster performance of the initial iteration. It must be noted that Iwill has tweaked the board's clock generators to let the board run with a 166MHz doubled-pumped bus and thus work with DDR333, the next step in DDR memory. However, to achieve the higher speeds, you have to overclock your processor as well. Because we were looking to remove CPU frequency from the equation and create as level a playing field as possible, we opted against OCing our processor. However, you can rest assured we'll investigate the promise of DDR333 in due time.

So what are the variables, and what are the constants in this DDR chipset conflict? The only variables are the motherboards and the chipsets that sit atop them. The constants are all other attendant pieces of hardware. All test rigs used the same 1.53GHz Athlon XP 1800+ CPU and 256MB stick of PC2100 CL2 Micron DDR memory, except for the nForce board, which used two 128MB sticks of PC2100 CL2 Micron memory. The rigs also used identical Leadtek GeForce3 cards with 21.83 Detonator 4 drivers, single IBM 60GXP hard drives with RAID and audio disabled, and clean installs of Windows XP. Finally, we installed the latest drivers and BIOS for each specific motherboard.

Keep in mind, this is a referendum on chipset performance, not motherboard build quality. If we were looking to determine the finest mobos in the land, we'd conduct a speed trial that compares mobos that use the exact same chipset. Also, please note we used the exact same benchmarks we used in our Pentium 4 chipset speed trial (page 33). Feel free to cross-reference the Intel platform scores with the AMD platform scores—just for cheap thrills.

RESULTS: AMD has long murmured it doesn't want to be in the chipset business and only manufactures the darn things to ensure that motherboard vendors will have bullet-proof core-logic for their Athlon mobos. Unfortunately, AMD's 760 has been the fastest game in town, so everyone's been clamoring for it. Well, here's some "good" news for AMD: In our speed trials, the 760 was handily eclipsed by chipsets from VIA and nVidia. Shoot, even ALi's MAGiK 1 closed the gap on the AMD 760.

In our *SYSmark2001* test, VIA's KT266A

	VIA KT266A	AMD 760	NVIDIA NFORCE	ALI MAGIK 1
SYSmark2001 CC	178	174	178	172
Quake III MPC	81fps	76fps	83fps	80fps
3DMark2001	7146	7006	7087	6806
Photoshop 6.0.2	62 sec	79 sec	64 sec	67 sec
Premiere 6.0	180 sec	188 sec	180 sec	184 sec
SiSoft Sandra 2001 RAM	849	743	925	702
SiSoft Sandra 2001 CPU	4303	4247	4311	4292
MusicMatch 6.0	223 sec	223 sec	222 sec	225 sec

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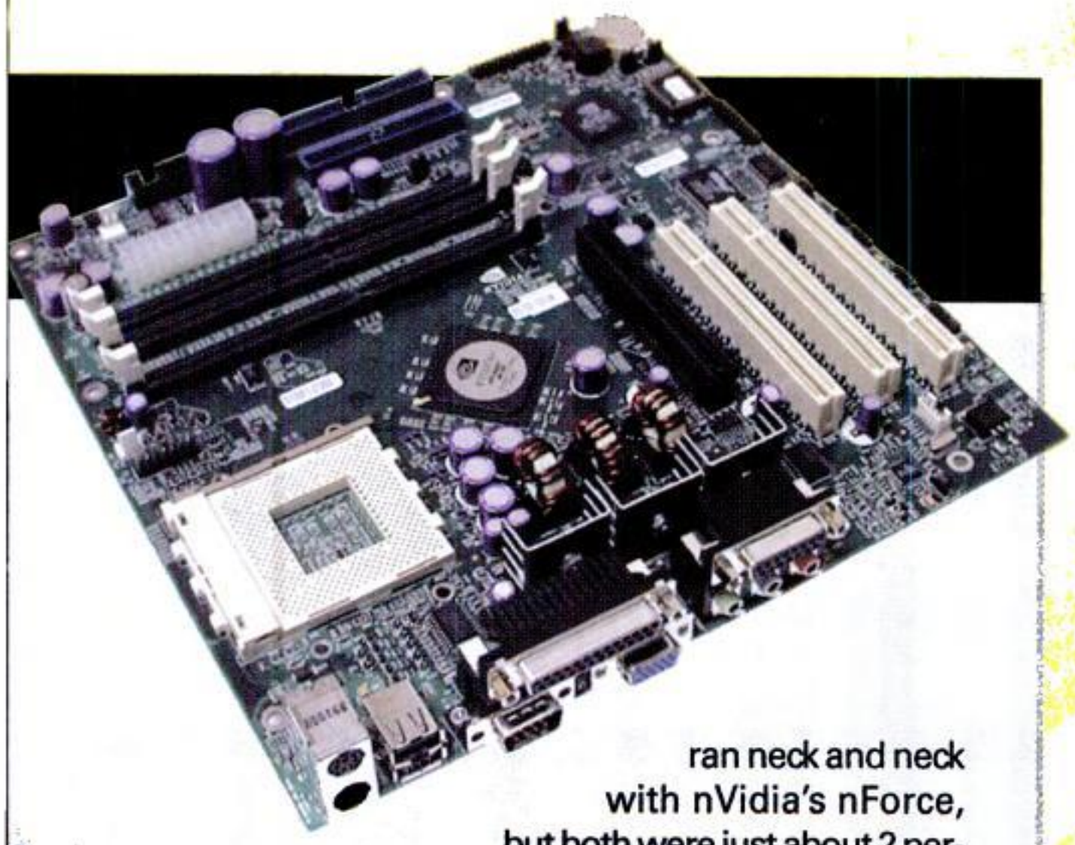


ran neck and neck with nVidia's nForce, but both were just about 2 percent faster than the AMD 760 and MAGiK 1 chipsets. However, all three upstart chipsets ran away from the AMD 760 in our *Quake III* benchmark. The nForce, for example, was nearly 10 percent faster than the 760.

While the nForce was the leader in *Quake III*, the nVidia chipset lost to the VIA KT266A (albeit by a thin margin) in the *3DMark2001* benchmark. It must be noted that this particular *3DMark2001* test reports a cumulative score based on more than a dozen different tests, some of which are much more memory bandwidth–dependent than the test suite's "pure videocard" tests. While the ALi MAGiK 1 chipset surpassed the AMD 760 in *Quake III*, it brought up the rear in *3DMark2001* with a score that was about 5 percent slower than the KT266A chipset's.

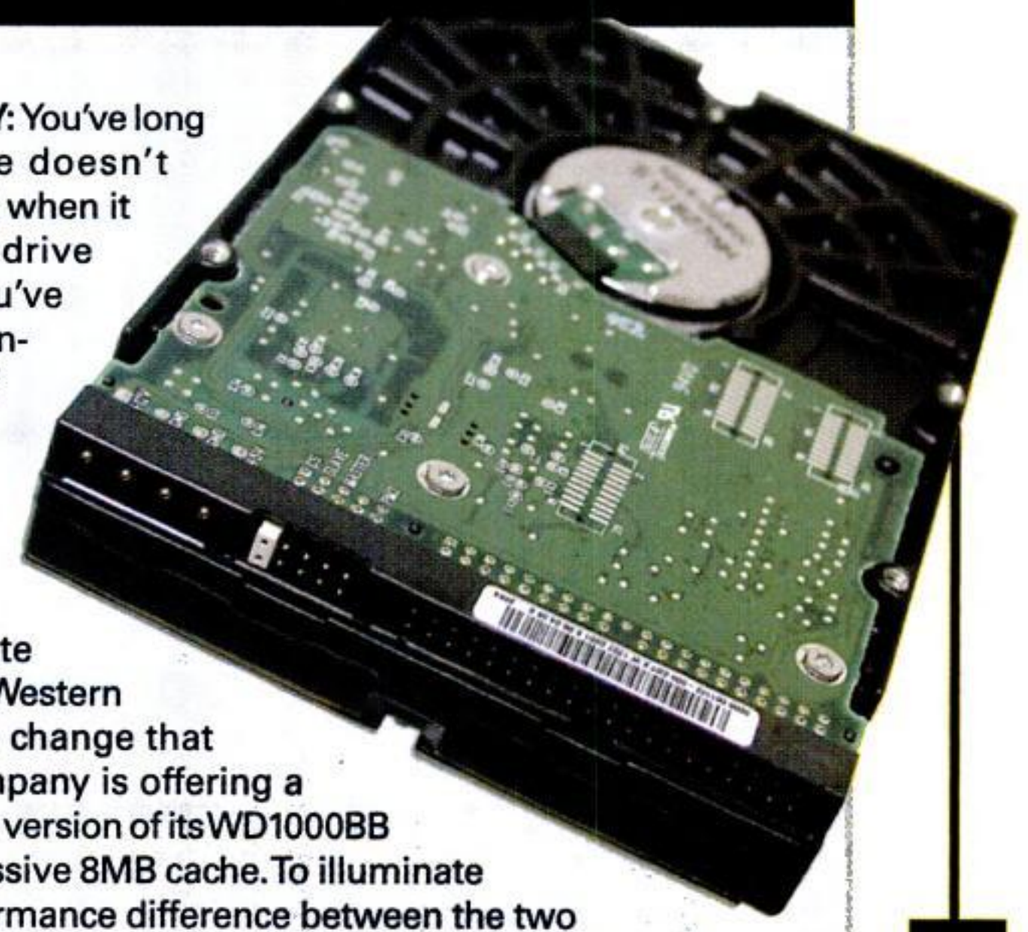
The KT266A and nForce chipsets had their best showings in our own Lab-brewed *Photoshop 6.0* action script test. The KT266A blew past the AMD 760 by 17 seconds! In fact, all of the non-AMD chipsets kicked the 760's ass in *Photoshop*. Why such a wide margin? Obviously, a large portion of the performance can logically be ascribed to the essential speed of the chipsets' memory pipes. But southbridge/IDE performance may come into play as well. Both the KT266A and nForce use special technologies to connect the CPU/memory subsystem to the IDE bus, and our *Photoshop* test does use a few actions that force the program to revert back to the original image sitting on the hard disk. So perhaps the VIA 686 southbridge chip that's teamed up with the AMD 760 was showing its age. Hell, even the MAGiK 1 was faster.

In the SiSoft *Sandra* RAM benchmark, the MAGiK 1 was the worst performer, while the AMD 760 demonstrated just slightly better bandwidth. The KT266A clocked in with about 15 percent more bandwidth than the 760, but was clearly slower than the nForce. It looks like the nForce's 128-bit DDR memory may have paid off dividends, as it was almost 25 percent faster than the AMD 760.

OK, so what's our overall impression of these four contenders? At this point, we have to declare a tie between VIA's KT266A and nVidia's nForce. Both are much faster than the AMD 760 and ALi MAGiK 1. The nForce also has somewhat of an edge, as it carries nVidia's reputation for rock-solid drivers and support. We must also point out that the nForce board we tested was late beta hardware; there may still be some performance to be wrung out of nVidia's chipset.

In the here and now, VIA and nVidia have the chipsets to beat, but all that may change when DDR333 memory support enters the equation—ALi and VIA are close to offering native DDR333 memory support without any CPU overclocking necessary.

8 Does an 8MB hard drive cache really do jack?



METHODOLOGY: You've long heard that size doesn't matter—at least when it comes to hard drive cache. After you've reached a reasonable level of cache, say 2MB, anything more is overkill. That's been the conventional wisdom for quite some time. But Western Digital is out to change that notion. The company is offering a "special edition" version of its WD1000BB drive with a massive 8MB cache. To illuminate the actual performance difference between the two drives, we took a standard 1000BB with 2MB of cache and put it up against the 8MB special edition. Western Digital says the drives are mechanically identical except for their cache sizes—same 100GB capacity, same ATA/100 interface, same 7200rpm rotational speed.

Our test bed included a 2GHz Pentium 4, 256MB of PC800 Kingston RDRAM, a clean install of Windows XP Professional, and the Leadtek GeForce3 with the 21.83 version of nVidia's Detonator drivers. For benchmarks, we selected *HD Tach 2.61* and *SYSmark2001*.

RESULTS: *HD Tach* revealed very little at first. The 8MB cache gave the 1000BB just a slight edge in average reads from the drive. But a closer look at the performance of the 2MB drive showed us that cache probably does come into play during brief spurts. We watched the test runs in progress, and with the 2MB drive, the drive's read speed would plummet considerably for a brief flash every few seconds. We're not absolutely sure what caused the stalls, but we suspect it was the limited cache. With the 8MB drive, the stalls were much less prevalent. In the end, the 8MB drive had a minimum read speed of 18MB/sec, while the 2MB drive had a minimum read speed of 4MB/sec. But of course, it's important to reiterate that average read speeds were barely affected.

In *SYSmark2001*, the results for 8MB of cache were much more cheery. While the testing suite's cumulative content creation score remained steady at 204, the office productivity portion of the tests jumped from 162 to 171 when we graduated to 8MB. That's a big difference.

	2MB CACHE	8MB CACHE
HD Tach AVG	37.3 MB/sec	37.5 MB/sec
HD Tach Minimum	4 MB/sec	18.1 MB/sec
SYSmark2001 OA	162	171

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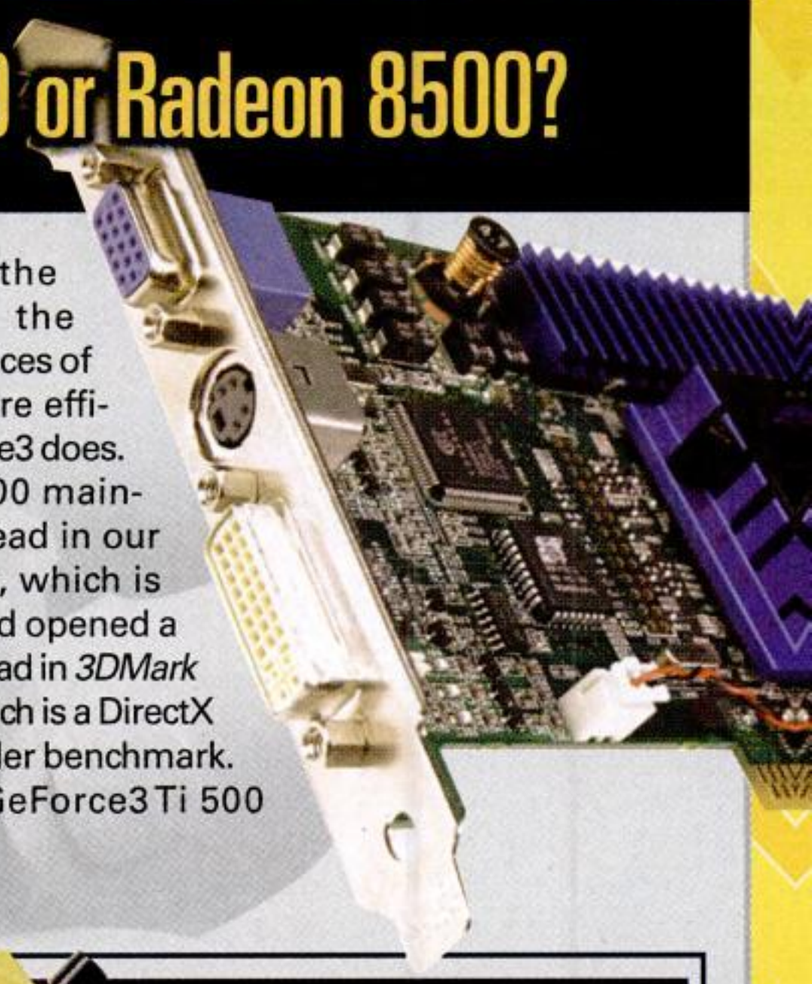
9 Which 3D chip is faster: GeForce3 Ti 500 or Radeon 8500?



METHODOLOGY: For the past two months or so, nVidia and ATI have been locked in a fierce battle for the 3D frame rate throne. We've covered the brawl in our reviews section, but never in a decisive, head-to-head fashion: nVidia's GeForce3 Ti 500 wasn't yet reviewable when we completed our ATI Radeon 8500 review, and both manufacturers have done some driver revs during the last two months of reporting. But now that both companies' best efforts are finalized, it's time to see which 3D chipset reigns supreme.

Visiontek's Xtacy 6964 board represents the GeForce3 Ti 500, nVidia's top accelerator. The Radeon 8500 represents ATI's fastest technology. Both boards sport 64MB of fast DDR memory. Each was tested in a standard HP Pentium 4 test bed running a clean install of Windows XP Home with no other software installed except our benchmark tests and the latest Intel i850 drivers. The tests included our own *Quake III* demo and Game 1, Game 2, Game 3, and Game 4 from *3DMark2001*, all set at high detail. Everything was run at 1280x1024 in 32-bit color with vsync, texture compression, and FSAA disabled. The *3DMark* benchmarks were run in D3D Pure Hardware mode.

RESULTS: ATI may have cleaned up its driver act (see related story on page 12), but the Radeon 8500 still performed a few frames slower than the Ti 500 in all of our benchmarks except for *3DMark* Game 2, where it was actually about 20 percent faster than the Xtacy. This is odd, because the Game 1, 2, and 3 benchmarks all test Direct3D performance in a traditional 3D pipeline, so we would expect the numbers in these tests to scale evenly. Our theory is that the Radeon handles the deformable mesh vertices of Game 2's dragon more efficiently than the GeForce3 does.

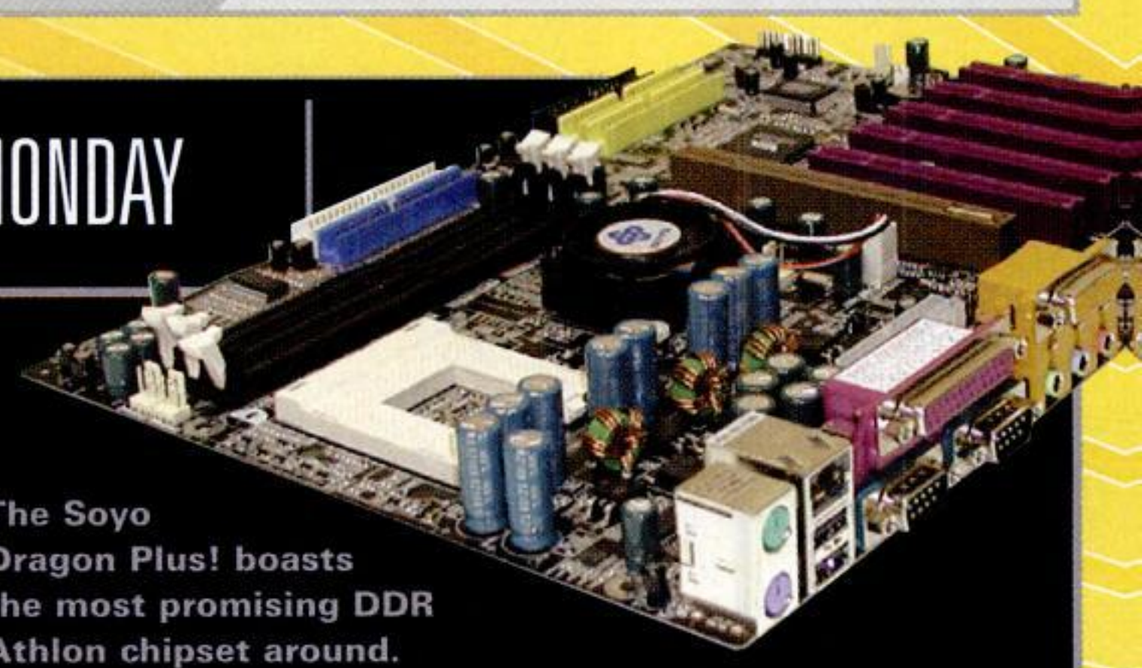
The GeForce3 Ti 500 maintained an 8 percent lead in our *Quake III* benchmark, which is based on OpenGL, and opened a whopping 20 percent lead in *3DMark 2001*'s Game 4 test, which is a DirectX 8/programmable shader benchmark.

Bottom line: The GeForce3 Ti 500 wins—for now.

	VISIONTEK XTACY 6964	ATI RADEON 8500
Quake III MPC demo	69.8fps	64.6fps
3DMark2001 Game 1	26.6fps	23.7fps
3DMark2001 Game 2	48.9fps	60.1fps
3DMark2001 Game 3	39.4fps	36.8fps
3DMark2001 Game 4	26.1fps	21.7fps

WIN ON SUNDAY, BUILD ON MONDAY

An old automotive industry adage states that if a car company can demonstrate winning technology during Sunday races, the technology will trickle down to street cars that sell better on Monday. We couldn't agree more—and this month's speed trials show that anyone can have race-bred technology if he or she makes the right system-building choices. So here's what we'd demand in our next PC hot rod:



The Soyo Dragon Plus! boasts the most promising DDR Athlon chipset around.

■ We'd start with a motherboard that uses VIA's KT266A chipset, such as the Soyo Dragon Plus! This chipset supports the most promising memory (DDR) for the most exciting CPU (Athlon XP). The nForce core-logic chipset from nVidia also supports DDR and Athlon XP, but no retail nForce mobos were available at press time.

■ If we were charged with building an Intel-based rig (hey, the platform is rock-stable), we'd reluctantly go with an RDRAM/850-based mobo to run the next generation of Pentium 4, which is slated for release in early 2000. DDR/845D provides slightly faster performance than RDRAM/850 in some applications when running 2GHz CPUs, but PC OEM elves who've played with faster P4s say RDRAM alleviates memory bottlenecks as CPU clock speeds increase.

■ If we were charged with building a non-gaming system, we'd of course go SMP—care of the Tyan Tiger MP motherboard, which supports dual Athlons and DDR memory. This board takes full advantage of two procs, but is a bit slower than the Soyo Dragon Plus! in games and other non-multithreaded apps.

■ On the hard drive front, we're still torn. Our editors who demand more write speed argue for a four-drive, striped RAID array. The ones who need faster reads would prefer to abstain from RAID altogether and implement a 7200rpm, high-areal-density hard drive with 8MB of cache.

■ Our 3D accelerator? The GeForce3 Ti 500, but of course. It's the only way to be sure. ■

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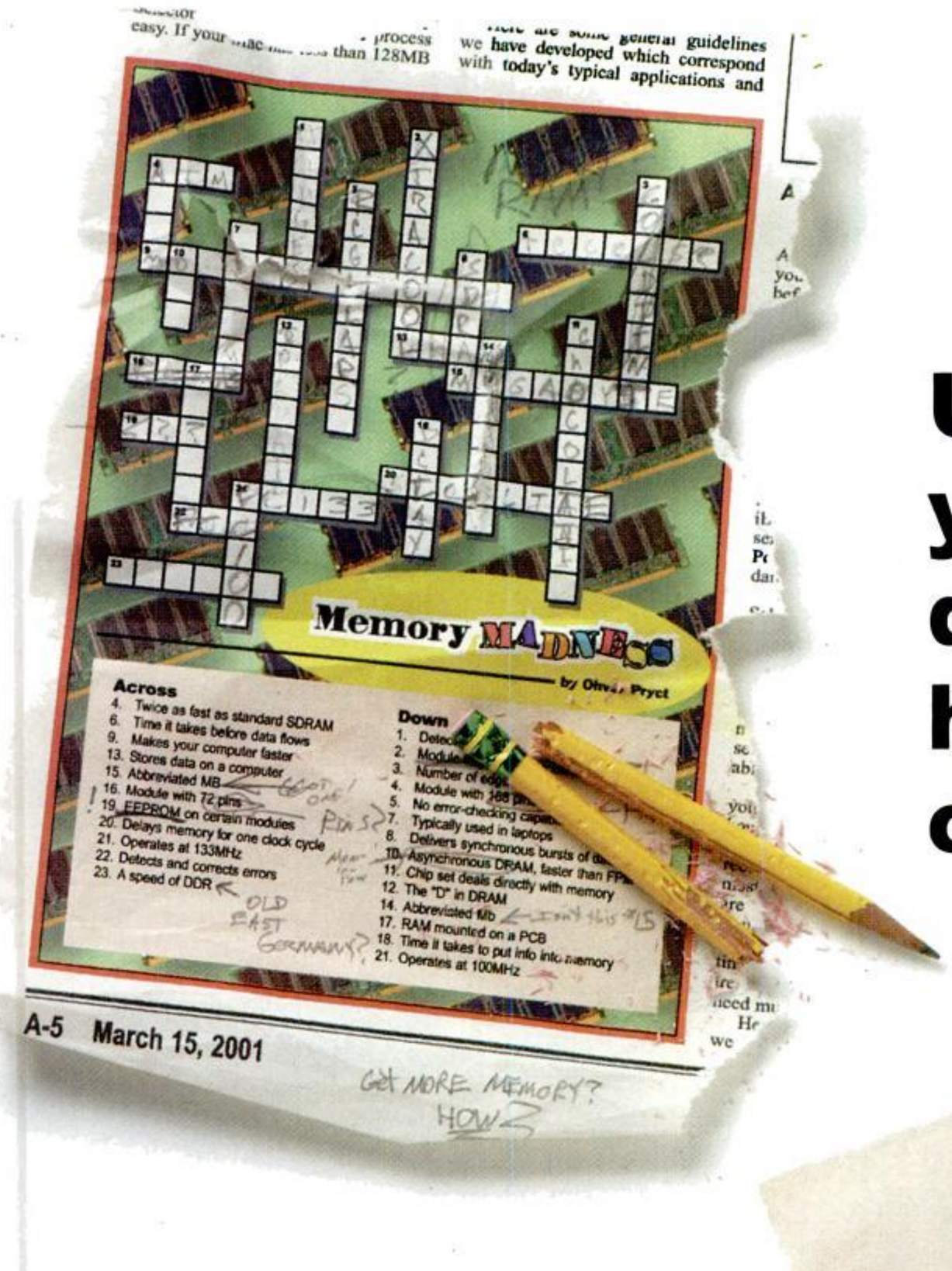
Your only source for factory-direct DDR!



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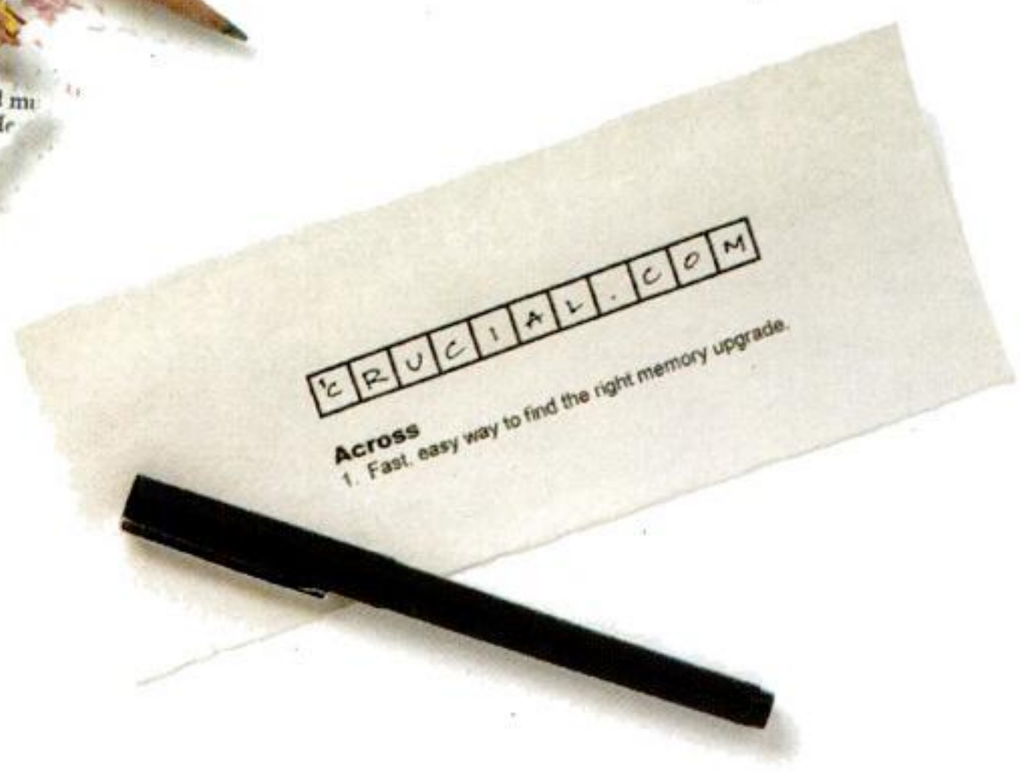

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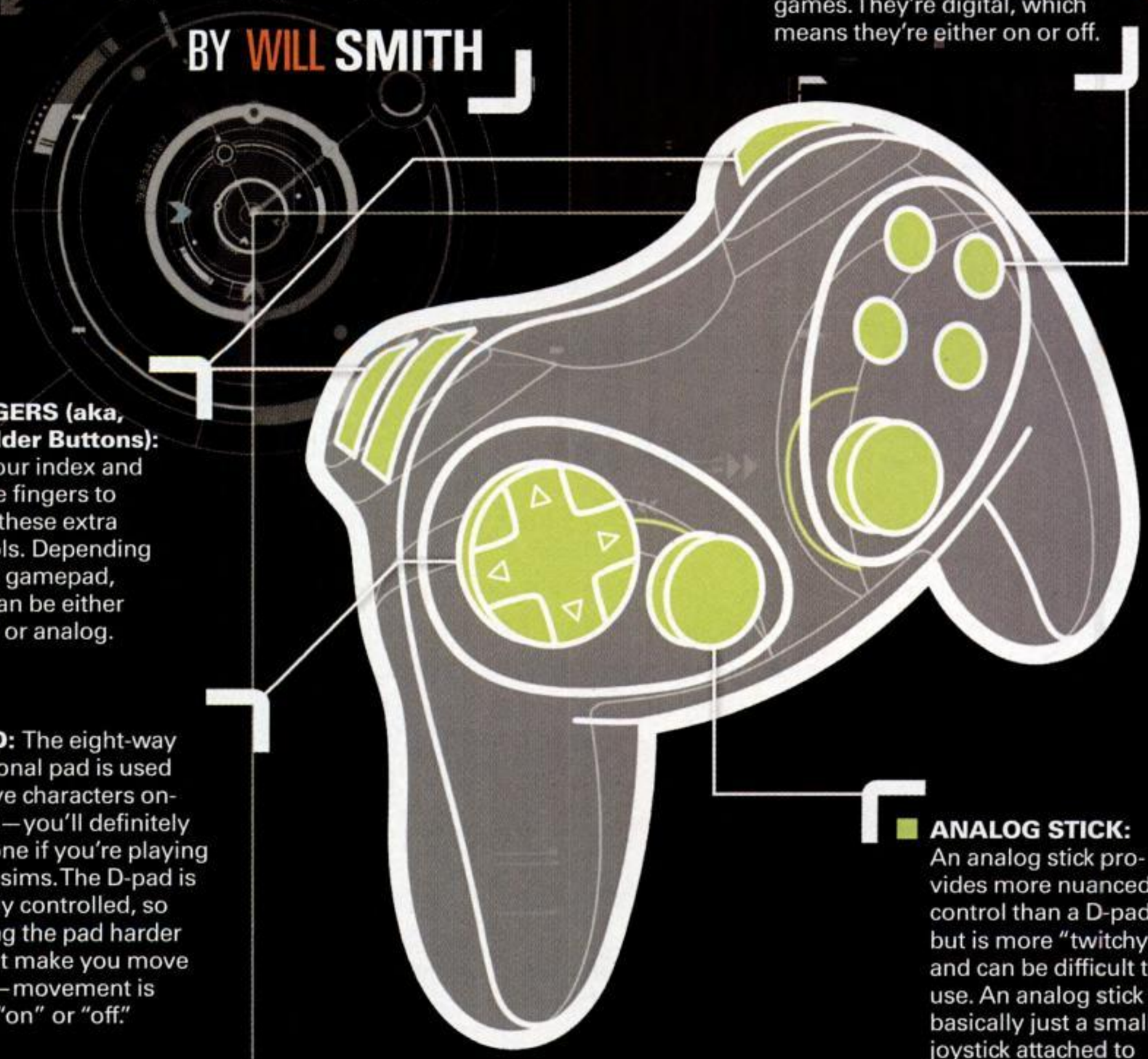
15 GAME CONTROLLERS GO HEAD-TO-HEAD IN A MAXIMUMPC HARDWARE DEATHMATCH

CONTROL-A-PALOOZA!

ILLUSTRATIONS BY **TROY DOOLITTLE** // PHOTOGRAPHY BY **KYLE TERBOSS**

If you're looking for the most badass, fragtastic game controller on Earth, you've come to the right place. We grabbed 15 different joysticks, gamepads, racing wheels, mice, and specialty controllers, then put them through gaming hell. Find out which ones helped us whup the competition without mangling our own hands in the process. But before you hit the action on the main stage, please check out our primer on all the buttons you may encounter on joysticks, gamepads, and driving wheels.

BY WILL SMITH



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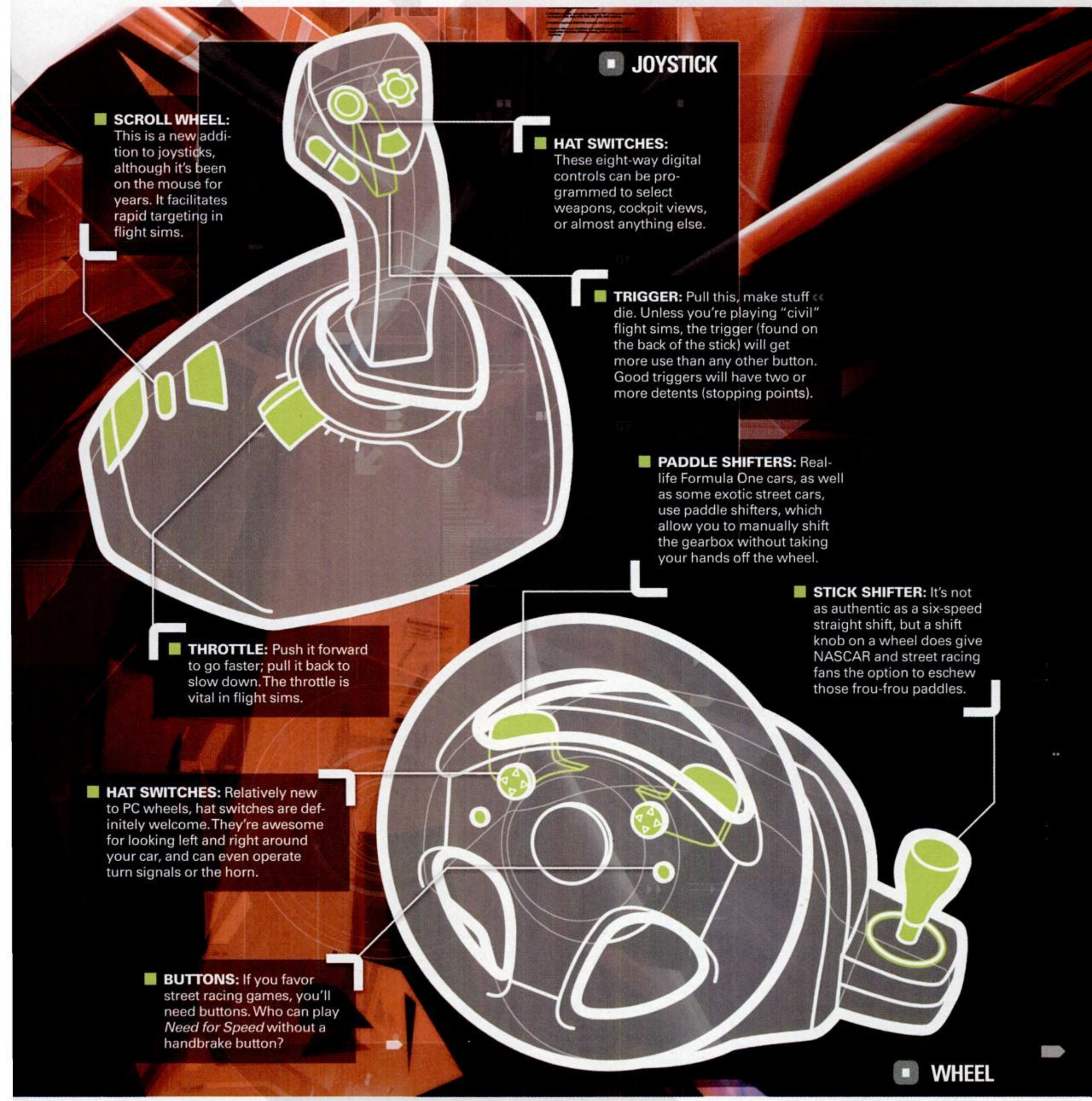
JOYSTICKS//PAGE 40// MICROSOFT SIDEWINDER PRECISION 2, LOGITECH WINGMAN STRIKE FORCE 3D, THRUSTMASTER TOP GUN FOX 2 PRO SHOCK **GAMEPADS**//PAGE 41// BELKIN NOSTROMO N45 DUAL ANALOG USB, THRUSTMASTER FIRESTORM DUAL POWER, MICROSOFT SIDEWINDER USB **WHEELS**//PAGE 42//THRUSTMASTER NASCAR PRO FORCE FEEDBACK, LOGITECH MOMO FORCE, MICROSOFT SIDEWINDER FORCE FEEDBACK WHEEL **MICE**//PAGE 43// LOGITECH IFEEL, LOGITECH DUAL OPTICAL, MICROSOFT INTELLIMOUSE EXPLORER **CONTROL FREAKS**//PAGE 44// BELKIN NOSTROMO N50 SPEEDPAD, MICROSOFT STRATEGIC COMMANDER



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JOYSTICKS

MICROSOFT SIDEWINDER PRECISION 2

VERDICT 8 **$55** www.microsoft.com/sidewinder

Even though it doesn't include a scroll wheel, a super-heavy base, or any of the fancy-schmancy force-feedback effects of the Logitech Strike Force 3D, the Sidewinder Precision 2 is unbeatable if you're looking for a mid-priced stick with an awesome button layout and razor-sharp targeting accuracy. It also offers the best layout for small- to medium-size hands, with buttons mere millimeters away from where small- to medium-size fingers tend to rest. Ham-fisted gamers, however, might have problems accidentally squashing buttons in the heat of a firefight. Such is the plight of the glandularly gifted.

While some of us sorely missed the hot 'n' heavy force-feedback effects that the Logitech stick provides, we realize there's an audience—however small and misguided—that prefers feedback-free gaming. If you're one of the minority, the Precision 2 should keep you at the top of the killboard.

HAT SWITCHES **1** BUTTONS **8** THROTTLES **1** AXES ON JOYSTICK **3** FORCE FEEDBACK? **NO**

LOGITECH WINGMAN STRIKE FORCE 3D

VERDICT 9 **$90** www.logitech.com

Whether we're playing a space sim such as *Independence War 2* or a flight sim like *Combat Flight Simulator*, the Strike Force 3D is the force-feedback stick we reach for first. It's proportioned to fit in hands of all sizes, and its button layout is superb—both of the eight-way hat switches are easily accessible without causing you to accidentally mash any other buttons. But it's the scroll wheel situated on the stick's base that makes the Strike Force 3D a must-have controller. It's perfect for cycling through targets with ease and will become a de facto feature on sticks of all creeds and colors if there's any justice in this world.

The stick's force-feedback effects are comparable to those of the Microsoft Force Feedback 2, delivering strong, jolting sensations when you're taking enemy fire, and reproducing with convincing realism the varying resistance you'd expect when pulling a tight turn or 4G inverted dive. This stick would have been Kick Ass if it came with a heavier base and was offered in southpaw trim.

HAT SWITCHES **2** BUTTONS **6 PLUS SCROLL WHEEL** THROTTLES **1** AXES ON JOYSTICK **3** FORCE FEEDBACK? **YES**

THRUSTMASTER TOP GUN FOX 2 PRO SHOCK

VERDICT 4 **$40** www.thrustmaster.com

Words can barely describe how much this stick sucks. From the pointy, painful hat switch to the plastic molding that could have only been designed to defend the stick from human thumbs, the Top Gun is an ergonomic disaster. We especially hate that button Number 2 has to be hit with the same finger as the trigger, making it impossible to hit both at the same time.

But quite possibly the worst thing about this stick is its lame "Shock" force-feedback effect. Instead of using a system of motors in the base to actuate force-feedback effects, the Fox 2 Pro Shock includes only a vibrating motor in the handle. It delivers absolutely no resistance and is actually better suited for an adult novelty than a gaming stick. That stated, the Top Gun did manage to track fairly well in the games we tested, and it has an adjustable strength tension knob in the base. Sadly, the knob only allows you to adjust stick tension from "very weak" to "weak."

HAT SWITCHES **1** BUTTONS **7** THROTTLES **1** AXES ON JOYSTICK **3** FORCE FEEDBACK? **KINDA**

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GAMEPADS

BELKIN NOSTROMO N45 DUAL ANALOG USB GAMEPAD

VERDICT 7 **$25** www.belkin.com

Don't be put off by its unconventional appearance—despite its screwball shape, the Nostromo n45 can be a comfortable gamepad that, like the Thrustmaster Dual Power, replicates the button layout of the PS2 Dual Shock. But instead of being made of a single, smooth and rounded piece of plastic, the Nostromo features a bunch of bumps and protrusions with buttons and grips at more or less the traditional places. We have a gripe with the shoulder buttons—they would be easier to manipulate if placed on a traditional sloping curve. Also, big-handed folk beware: The weird bottom loop that connects the two grip pontoons might cause you problems. If you decide to pick up a Nostromo n45, make sure you download the most recent drivers from Belkin's web site, as the shipping drivers had troubles in Win2000.

ANALOG STICKS **2** DIGITAL PADS **1** BUTTONS **13** RUMBLE EFFECTS? **NO**

THRUSTMASTER FIRESTORM DUAL POWER

VERDICT 10 **$30** www.thrustmaster.com

From the same company that brought us one of the most ass-tastic joysticks we've ever had the extreme displeasure of holding, we also get our current favorite gamepad, the trusty-thrusty Firestorm Dual Power. Patterned after the Playstation 2 Dual Shock gamepad, the Dual Power comes with two analog sticks, four right-finger buttons, a directional pad, and four shoulder buttons. Thrustmaster also throws in another pair of triggers for your middle finger, and covers the entire pad in a soft, rubbery, comfortable grip. Even after extended periods of time—two hours and longer—our hands were still comfortable holding the Firestorm. And unless you have hands the size of Shaq's, the pad should fit you fine.

As with all gamepads, the Firestorm's force-feedback effects consist of an occasional vibration and not much more. Still, a little rumble action in a gamepad makes a lot of difference when you take a hit in *Spider-Man* or get tackled in *Madden*.

MAXIMUM PC KICK ASS PRODUCT

ANALOG STICKS **2** DIGITAL PADS **1** BUTTONS **13** RUMBLE EFFECTS? **YES**

MICROSOFT SIDEWINDER USB

VERDICT 8 **$25** www.microsoft.com/sidewinder

The original Microsoft Sidewinder gamepad makes a triumphant return with a tasty new USB connector. Although it's the most bare-bones gamepad in our roundup, it does the job perfectly for nine-tenths of the gamepad-oriented games that people will play on a PC. And if you've got hands the size of a dinner plate, you'll find that the Sidewinder USB is the easiest controller to use.

The Sidewinder's buttons and single D-pad are laid out similarly to the Sega Genesis fighting controller. Microsoft also tosses in a few trigger buttons for games in which six buttons just won't do. If elegance is truly found in simplicity, then the Sidewinder USB is certainly the most elegant controller we've seen. Missing from this pad is any kind of analog control. This will be a problem only if you plan on playing console ports such as *Tony Hawk 2* or *Spider-Man*, which beg for the precision that analog control provides.

ANALOG STICKS **0** DIGITAL PADS **1** BUTTONS **8** RUMBLE EFFECTS? **NO**

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THRUSTMASTER NASCAR PRO FORCE FEEDBACK

VERDICT 9 **$100** www.thrustmaster.com

If you're reluctant to shell out $200 for a steering wheel that you'll use just a few times a month for just a handful of racing games, you should take a look at the Thrustmaster NASCAR Pro Force Feedback. The gear-based force-feedback system produces satisfying effects, but the cog assembly is loud and grindy and therefore negates the suspension of disbelief that's so important for racing sims. Nonetheless, it's still a great wheel for casual racing and costs half the price of the MOMO.

Perhaps the nicest thing about the NASCAR Pro is its excellent control configuration. Unlike the other wheels we've seen, this one includes paddle shifters behind the wheel (for F1 action) *and* a stick shifter to the right (for stock car racing). It also has a pair of eight-way hat switches and two buttons, all of which are easily accessible when your hands are at the 3 and 9 positions.

SHIFTER TYPES **PADDLES AND SHIFTER** BUTTONS **2, PLUS 2 EIGHT-WAY HATS**

LOGITECH MOMO FORCE

VERDICT 9 **$200** www.logitech.com

No other racing wheel let us feel the road under our rubber like Logitech's MOMO Force, which created the most realistic force-feedback effects we've felt since Logitech discontinued the original Formula Force. Whether we were slipping on wet leaves, making suicidal hairpin turns, or driving over bumpy cobblestones, we could feel exactly how far our cars could be pushed without losing control. The kit's over-the-top leather steering wheel and beveled pedals feel like they're from an actual race car, unlike most other plasticky PC wheels and pedals. And why shouldn't they? MOMO, after all, is famous for its aftermarket tuning parts (our editor-in-chief wouldn't mind a MOMO wheel in his M3). Of the three wheels we tested, the MOMO seemed to offer the best clamping mechanism for a wide variety of computer desks.

While the MOMO offers awesome driving realism, it leaves a little to be desired in the button department. With only six buttons and two paddle shifters, novelty driving-game aficionados might find themselves ass-out when they want to fire missiles upon opposing cars.

MAXIMUM PC KICK ASS PRODUCT

SHIFTER TYPE **F1-STYLE PADDLES** BUTTONS **6**

MICROSOFT SIDEWINDER FORCE FEEDBACK WHEEL

VERDICT 7 **$160** www.microsoft.com/sidewinder

Powerful and convincing force-feedback effects and a super-convenient mounting mechanism almost make up for lame shifter buttons and wimpy pedals. The Sidewinder Force Feedback Wheel's attachment mechanism beats the hell out of the screw clamps used on almost all other wheels we've seen—you simply adjust the tension one time for your particular desk, then use the quick release lever to mount or remove the wheel. It'll take less time to mount the wheel to your office furniture than it takes to plug in everything.

The Sidewinder also reproduces force-feedback effects convincingly and without the "geary" sensation present in the Thrustmaster wheel. Unfortunately, the Sidewinder's pedals don't offer realistic resistance, and the wheel-mounted shifters aren't actually paddles, but rather buttons. They're positioned in more or less the correct place, but don't scream authenticity. This low-budget shifting solution is simply unacceptable.

SHIFTER TYPE **WHEEL-MOUNTED BUTTONS** BUTTONS **6**

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MICE

MAXIMUM PC KICK ASS PRODUCT

LOGITECH iFEEL

VERDICT 9 **$40** www.logitech.com

Logitech hit one out of the park with the original blue iFeel mouse. Sure, it featured a low-res, 400dpi optical sensor, but gamers loved the tactile, quasi-force-feedback sensations it provided in titles like *Unreal Tournament, Tribes 2,* and *Half-Life*. Now the iFeel is back again with an improved 800dpi optical sensor for even sharper tracking.

In case you're not hip to iFeel effects, they give you very useful tactile feedback when you scroll over menu items and desktop icons. But the most useful effects that feedback mice offer are unique vibrations that help you identify different weapons in shooters such as *Half-Life*. The iFeel features the standard two-button/wheel doohickey layout. Luckily, with the latest version of *Mouseware* and Windows XP, the scroll wheel functions exactly as it's supposed to, fixing problems that have plagued previous Logitech mice.

LOGITECH DUAL OPTICAL

VERDICT 9 **$50** www.logitech.com

At last, we finally have an optical mouse worthy of gaming—it tracks quickly enough to handle your sharpest movements and doesn't restrict you to the small expanse of a mouse pad during rigorous play. By adding a second 800dpi optical sensor to the base, Logitech eliminates the poor tracking problems endemic to single-sensor mice. You know what we're talking about if you've ever quickly moved your single-sensor mouse: The sensor loses its point of reference and the cursor jumps all over the desktop, which is annoying in Windows and downright fatal in a deathmatch. The second optical sensor in the Logitech Dual Optical made it virtually impossible for us to lose tracking.

The Dual Optical has a fairly standard button layout, with the standard two buttons and wheel doohickey on the top and a thumb button on the left side. Everything is fully programmable using Logitech's *Mouseware* software. That stated, Windows 2000 users take note: We totally hosed our test system using the version of *Mouseware* that ships with the Dual Optical. Make sure you download the latest revision from Logitech's web site.

MAXIMUM PC KICK ASS PRODUCT

MICROSOFT INTELLIMOUSE EXPLORER

VERDICT 8 **$55** www.microsoft.com

The original Microsoft Intellimouse Explorer was equally loved and hated by PC gamers. Critics dissed its pathetic 400dpi optical sensor resolution and found the shape to be excessively big and clunky. Supporters, meanwhile, thought the very same shape was pleasingly large and easy to grip, and they were willing to trade perfect tracking for a ball-less assembly that didn't require constant cleaning.

The Intellimouse Explorer Mark 2 increases resolution to 800dpi and is much more svelte. If you have small paws, you'll probably appreciate the downsizing, but if you've come to love the massive, bulbous shape of the original, you'll be disappointed. The new Intellimouse inherits the same basic button layout, with two buttons and a scroll wheel on top and two thumb buttons on the side. The thumb buttons are much smaller in this revision and are less likely to be hit accidentally. Try programming one for "next weapon" and the other for "previous weapon."

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CONTROL FREAKS

BELKIN NOSTROMO N50 SPEEDPAD

VERDICT 9 **$36** www.belkin.com

Here it is, folks: The first controller specifically designed for first-person shooters that almost *improves* upon the standard mouse/keyboard combo (many have tried, but all have failed). This little USB device is shaped like the ASDW section of a standard keyboard and includes 10 familiar-looking keyboard buttons, an eight-way hat switch, and a scrolling wheel. The nice thing is that we were able to program each of the keys with any of three macros *or* keyboard shortcuts.

In addition to its macro functionality, the Speedpad is more ergonomic than a standard keyboard because it's designed to be moved around and placed at any angle. It's also a great accessory for playing shooters on notebooks—an ingenious device that allowed us to focus on fragging, not searching for the right key. Pair it up with a good gaming mouse, and we guarantee you'll forget about all the FPS controller travesties of the past. Our only knock against the Speedpad is that its macro software is difficult to use, and we would prefer a few more keys on its truncated keyboard layout.

MAXIMUM PC KICK ASS PRODUCT

MICROSOFT STRATEGIC COMMANDER

VERDICT 9 **$50** www.microsoft.com/sidewinder

Talk about genre specificity: The Strategic Commander is dedicated to the complete control of realtime strategy games—all other game types need not apply. The upshot is that you get a cornucopia of different programmable buttons that help you wage battles on multiple fronts without flinching.

Of course, a controller like this would be essentially useless if it didn't seamlessly work with all the high-profile realtime strategy games, but luckily, all the major RTSes either support the Strategic Commander natively or are supported with one of the Profile Packs that Microsoft provides on the Sidewinder web site. However, if you do have to bite the bullet and map your own buttons (or if you simply don't like the default button mapping), you're not out of luck. The Commander's nine main buttons can be programmed with one of three different keyboard shortcuts or macros. There's also a zoom rocker and a record button that allows you to quickly record macros for later tweakage in the editor. To top it all off, the entire assembly moves and twists, allowing you to pan your camera across the map and rotate around a point in supported games.

MAXIMUM PC KICK ASS PRODUCT

FIRST-PERSON FAILURES

WE'VE SEEN DOZENS OF CRAPTACULAR FPS CONTROLLERS ATTEMPT TO SUPPLANT THE TRUSTY KEYBOARD AND MOUSE COMBO—ALMOST ALL FAIL MISERABLY. HERE ARE A FEW OF THE WORST.

The Logitech Cyberman 2—one of the first Windows 95–only controllers—supposedly allowed an FPS player to move independently across all three dimensions. While using a puck-shaped controller in FPSes *seemed* like a great idea, in practice, any poor schmuck stuck with this thing got owned in deathmatches.

The SpaceOrb—or Sporb as it was affectionately dubbed by celebrity spokeswoman Stevie "John Romero's Girlfriend" Case—consisted of a rubberized ball attached to a gamepad-shaped controller with six buttons. In theory, the Sporb allowed you to circle-strafe around the most dastardly deathmatch opponent with ease. All you had to do was twist the ball. In reality, however, the Sporb was so twitchy that instead of smoothly circling the enemy, you ended up spinning around like some sort of seizure victim. Pundits have noted that the sponsorship deal with the SpaceOrb almost exactly coincides with the demise of Stevie Case's credibility.

Our final failure case study is the Microsoft Sidewinder Dual Strike. You were supposed to move the right pontoon to control head-looking, and the hat switch on the left pontoon to control ASDW movement. Unfortunately, moving the right pontoon created nauseating, unpredictable perspective changes and removed all semblance of control from your FPS-ing. The Dual Strike's lurching movement was easier to handle than the Sporb's wild spinning, but anyone who used a Dual Strike was just as dead as a Sporb user during frenzied multiplayer combat. ■

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KNOW YOUR PC RIGHTS

Can you legally use a keystroke catcher to monitor your friend's PC? Is it legal to use "fixed executables" to play your games without their CDs? Can you be thrown in jail if you inadvertently download some type of sickening porn? Find out whether you're a cyber scofflaw or an upstanding citizen of the digital frontier!

BY KEVIN SAVETZ

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Illustration by Pixel Pushers Design

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You May Already Be a Criminal.

Unless you've suffered through years of law school—hell, even if you *have* suffered through years of law school—it can be difficult to nail down exactly what's legal and what isn't when working on your PC. And sometimes the law even gives you rights that a license agreement summarily takes away. So we asked several attorneys and other experts who specialize in computer-related law for answers to the most burning PC-related legal questions. Read on to find out if your computing exploits are actually part of a rich and varied life of crime.

Is It Legal for Me to Make Backup Copies of My Software for My Own Personal use?

The law says yes: Archival backups are indeed legal. But your software's license agreement may say no.

For any particular piece of software, the answer as to whether backups are allowed depends on the language of its end-user license agreement, or EULA, a document that comes with nearly every piece of software, but that hardly anyone actually reads. The license agreement is a terms of service contract that can supercede the rights given to you by established copyright law, such as the right to make backup copies. "Copyright law sets a default, but these licenses are designed to say, 'We don't want that bargain. We want to strike our own bargain,'" says Robin Gross, staff attorney for intellectual property at the Electronic Frontier Foundation (**www.eff.org**). Gross says the issue of EULAs superceding federal law is the subject of much debate and disagreement: "Some courts have held that those software licenses are binding on the theory that one can contract away certain rights one would otherwise have, and others have found them unenforceable. Unfortunately the law is quite murky here."

Luckily, most licenses do indeed allow you to make a backup copy of the software. Typically, a license agreement will specifically permit archival backups, or it won't mention the issue at all. If the license doesn't mention backups, then they are allowed.

But what about one of the most popular installs on the planet? In fact, the license agreement for Microsoft *Office* might leave you scratching your head: It says you can keep the original media after you install—that's your backup, pally. The exception is if the disc is required to run the software. In that case, you can make one backup.

"The bottom line is people need to read those license agreements rather than ignore them," says Ross Kodner, president of MicroLaw, Inc., a legal technology consultancy. Kodner suggests that companies that use many software products create a database that summarizes the key points related to each program's license agreement, keeping it all in simple language. Home users don't have it so easy—so grab a cup of your favorite beverage and slog through those pages of tiny, dense legalese if you actually give a hoot.

To date, *Maximum PC* knows of not a single instance in which an individual user was busted for "violating" the terms of a license agreement.

Is it Legal to Make MP3s of the CDs I Own? Am I Prohibited from Sharing Mix CDs with My Friends?

We know that your custom "Best of Abba" MP3 mix is important to you, so you'll be happy to know that making MP3s from your own CDs and copying those files to your MP3 player is "absolutely legal"—or so says Robin Gross of the EFF.

The Recording Industry Association thought otherwise in 1999, however, and sued Diamond Multimedia in an attempt to halt the distribution of the Rio MP3 player. In a subsequent decision, the 9th Circuit Court of Appeals sent the RIAA packing, saying that MP3 players provide for exactly the kind of "personal use copying" that's allowed by the Fair Use provision of copyright law.

"Fair use"—pay attention, this will come up again—is an exception to the copyright law. It allows duplication of copyrighted materials under certain circumstances, including personal, non-commercial use. "Fair use is part of the public right under the copyright bargain, a limitation of the copyright holder's right to control copying," Gross says.

Sharing copyrighted MP3s with your friends is a trickier question. Copyright holders have the right to control distribution of their work, so you're probably infringing on their rights by giving away copies. "Most folks would admit it's an infringement to make six million copies available on Napster... but copyright law is incredibly ambiguous. There is no clearly defined legal answer," Gross says.

So if you're going to share MP3s of copyrighted music, the safest bet is to not get caught.

Fair Use is an exception to the copyright law that allows duplication of copyrighted materials under certain circumstances, including personal, non-commercial use.

Copyrighted material

You're not legally obligated to inform anyone if you inadvertently download contraband porn, but you could theoretically be arrested.

If I Inadvertently Download Illegal Porn, Can I Be Arrested? Am I Obligated to Alert the Authorities?

So you're surfing around looking for some nice, wholesome smut when you stumble across something that would make even the most warped of perverts grimace and look away. Now what? Do you run to the cops and plead for the mercy of the court?

No, you're not legally obligated to inform anyone—it is not a crime to not report a crime—but you could theoretically be arrested. This is an issue where the law isn't settled yet, and unless you're starved for attention, you probably don't want to be the focus of an embarrassing, precedent-setting court battle. Just remember that once the objectionable porn has appeared on your screen, it's also in your browser's cache or tucked away somewhere else on your hard drive.

The general rule in determining what's obscene is that "community standards" prevail. In other words, whatever a particular community considers obscene is obscene in that area. Is that definition vague enough for you? It's important to note that there's a difference between "indecent material" (content that mat be smutty but is nonetheless tolerated in a community) and "obscene material" (content that isn't tolerated and is illegal). The line between the two is completely subjective and can vary from one community to another. So which community must you answer to? The answer is both.

"The Internet changes things. You're everywhere all at once," Gross says. Indeed, although you and your PC may be located in a "porn-friendly" town, you could be in hot water if you download obscene material from a web server located in the middle of the Bible Belt. "You can't be in every community simultaneously, but you could be held responsible for every community's standards," Gross says.

Ross Kodner of MicroLaw, Inc. agrees that online obscenity is a gray area of criminal law and that the rules differ depending on where you live: "If you're looking for pornography and inadvertently downloaded illegal material, would criminal liability be attached? I would say this would entirely turn on your intent." For instance, if the name of a newsgroup indicates that it contains illegal material, it's likely that someone browsing there is actively looking for illegal material. But if your download was truly an accident, you're off the hook: Without criminal intent, there can be no criminal act.

Despite all these gray areas, it's important to know that a few things are illegal no matter where you are. For instance, child porn (pornography featuring people under the age of 18) is illegal under all circumstances in the United States. Bestiality, too, is obscene everywhere.

"People need to practice smart surfing. There is clearly risk involved in looking at materials that are potentially illegal. Getting your jollies on the net has become complicated. If you don't want to have legal liability, don't do it," Kodner says.

Ah, clarity at last.

What's the Strongest E-Mail Encryption I Can Legally Use? Are There Any Legal Differences between E-Mailing an Encrypted File to a Friend Here in the U.S. and E-Mailing the Very Same File to a Friend in Europe?

Your grandmother wants to e-mail her zesty raisin cookie recipe to you, but insists on encrypting the message to make sure it remains a secret. Don't worry, the Feds won't send Grandma to the Big House for using super-strong recipe encryption.

There are no restrictions on exporting encrypted files: Grandma could encrypt her recipe with an uncrackable, 10 million bit key, then legally e-mail that encrypted recipe to her family in the United States, as well as to anywhere else in the world.

"There are no restrictions about what encryption routines you can create or use inside this country today," says Dale Haag, president of Net-Defender LLC, a computer security company. "You can use any encryption you want."

Now, Grandma's feeling pretty proud of herself and wants to release her powerful encryption software as freeware. Here's where she needs to be careful: Grandma can share the software with her friends in the United States, but there are complicated rules about exporting the software outside of the country.

"Under current Commerce Department export regulations, you can post encryption source code that is not commercial or proprietary on a web site and make it generally available to the world," says Lee Tien, senior staff attorney at the Electronic Frontier Foundation. But Grandma will have to notify the government (she should visit **www.bxa.doc.gov** for information) and follow much more complicated procedures if she wants to export commercial encryption software.

Can I Install My Office Application Suite on Both My PC and My Laptop?

The answer once again lies with our old friend the software license agreement. Some license agreements say yes, you can install software on two computers—as long as there's no possibility the software will be used in more than one place at the same time. Other agreements

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Copyrighted material

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specifically prohibit against installing the software on more than one computer.

If the license agreement doesn't address this issue, then it's safe to install the software on both of your computers. "The onus is on the software vendor to specifically indicate prohibitions. Absent [of these] prohibitions, end users have any rights they choose in terms of using the software," Kodner says.

Microsoft is (perhaps surprisingly) generous in this area: The license agreement for Microsoft *Office 2000* reads, "The primary user... may make a second copy for his or her exclusive use on a portable computer." However, it also notes that you can't use the program on more than one machine at the same time.

If the license isn't on your side, you can always switch to software with a more favorable license agreement. For instance, *StarOffice* (**www.sun.com/staroffice/**) allows you to install the program on multiple computers within an organization.

Is It Legal for Me to Monitor Someone Else's Activities with Keystroke Loggers or Monitoring Software?

Before you start playing private detective and snooping around on your ex-girlfriend's computer... well, just don't. Capturing keystrokes can get you in a whole mess of trouble. The Electronic Communications Privacy Act makes it unlawful to intercept a communication in transit. That could include intercepting keystrokes before the message is sent or reading a user's POP mail before it is delivered to his or her PC.

The rules are different at the workplace. Can your boss sniff around in your computer files? The laws vary from state to state, but you 're safe in assuming that employers have the right to control and monitor their computer systems."As a matter of good practice, employers should have a policy that discloses that their systems are the property of the company and use may be monitored by the company," says Alan Sutin, co-chair of the information technology and e-commerce practice Greenberg Traurig.

"A smart employer will indicate that there is no privacy that can be expected," Kodner says. "Smarter employers will even take the step to say, 'If you want to maintain confidentiality, do it on your home computer, not on our computers.'"

The privacy of personal e-mail accounts on a work computer is a dicey question, and whether snooping is allowed depends on what state you're working in. But it's easy for employers

f the license agreement specifically states so, your ISP has the right to monitor your mail and other online activities with impunity.

to monitor incoming and outgoing packets and even to observe your screen contents, so you'd be wise to conduct all personal correspondence on your home computer, or at least use a free, web-based e-mail service (such as Hotmail) when sending out resumes and love letters from work.

Is My ISP Allowed Full Access to All the Messages I Send via Its Service?

Can your Internet service provider (ISP) read your e-mail, track your web browsing habits, and otherwise spy on you? That depends entirely on the terms spelled out in the ISP's usage agreement. If the agreement specifically states that the ISP has that right, the answer is clear: The ISP can monitor your mail and other online activities with impunity. If that isn't mentioned, or there is no contract, then your ISP has no right to observe your online activities.

Virtually every ISP has a user agreement, much like the end-user license agreements that accompany software. "I think a vast number of people who subscribe don't read it—which is a fundamental mistake," says MicroLaw's Kodner. "People need to know what rights they are retaining and giving up. Nobody wants to read this material, but people are giving up or gaining very important rights that affect their lives," he says.

For instance, the "acceptable use" policy of AT&T Broadband service states "the company will not read or disclose to third parties private e-mail communications... except as required to operate the service or as otherwise authorized by law."

Why are all those agreements written in such hard-to-follow legalese? "The material is written by lawyers to comply with complex laws. Should it be written in plain English? Absolutely. Is that likely to happen in the near future? No," Kodner says.

I Want to Play a Game on My Laptop without Having to Carry around the CDs, so I Downloaded and Installed a "Fixed Executable" That Removes the CD-Check. Have I broken the Law?

You haven't broken the law, but you're probably violating the software license agreement. Remember, you didn't actually buy the game—you bought a license to use the game. Unless you read the fine print, you wouldn't know that by clicking "I agree," you actually entered a legal agreement to move to Tulsa and change your name to Sven.

Anyway, Sven, the license agreement probably disallows modifying the program code, and by installing a patch that removes the CD-check routine you are modifying the program code. That license agreement probably also says you're not allowed to do anything to permit multiple copies of the game to circu-

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late. Hacking the program to remove the CD-check would also break that rule.

Can I Use Stuff I Find on the Internet on My Personal Web Site?

Maybe—depending on what you're copying, how much of it, and why. The answer depends on whether your copying would be considered a "fair use."

Many factors determine what fair use is, and it can be difficult to establish exactly what's permissible and when you've gone too far. The copyright holder's idea of what's acceptable may be very different than yours. Many people have gotten nasty letters from lawyers for excerpting trivial amounts of material. Fortunately, there are some guidelines you can follow to cover your ass.

"Any time you're going to try to make a fair use of something, four factors are supposed to be taken into consideration," Robin Gross at EFF says.

First is the "purpose and character" of that use: For instance, are you making the copy for an educational purpose or for commercial gain? An educational use is more likely to be deemed fair use than is pilfering someone else's work for your own profit.

Second is the nature of the material that's being copied—reproducing a newspaper article and adding commentary would likely be deemed a socially valuable fair use, whereas posting a Dilbert cartoon on your "I Hate My Boss" web page probably would not. Of course, each individual situation is different, and ultimately the courts would decide if your particular use passes fair use muster.

Third is the amount and substantiality of the copy: Did you copy a large portion of the material or just a small excerpt? Small excerpts might pass muster.

The fourth and final factor is the effect on the market or value of the original work. If your particular copying replaces the copyright holder's ability to distribute and profit from that work, that's not a fair use.

In other words, quoting a couple sentences from a Harry Potter book on your Mugglemania fanpage is probably OK. But making the whole book available for download definitely isn't. And taking a cool image from Warner Bros.' official Harry Potter web site just because you like it is theft.

"The best approach any user could take is to never assume that copying anything is permissible. Create you own content," MicroLaw's Kodner says. Many companies actively search the Internet looking for abuse of their copyrights. "No one should think his or her site is below the radar screen of any company or individual that has a legitimate copyright to protect," he says. "Assume they will find out, and assume they will argue against fair use."

"For many people, the Internet is synonymous with the word 'free.' A lot of people assume things that show an utter ignorance of U.S. copyright and trademark laws. $250 for an hour of a lawyer's time could save you thousands of dollars," Kodner says. ■

WHAT'S HIDING IN YOUR LICENSE AGREEMENT?

Here are a few examples of the draconian prohibitions, over-the-top disclaimers, and even occasional acts of charity we found while poking around in the license agreements of our software here at the magazine (all italics are ours).

BE CAREFUL WHAT YOU SAY If there were ever a reason to scrutinize your license agreement, it would be this one. The end-user license agreement for Microsoft's *FrontPage 2002* Automatic Web Components has the following gem buried in a printed addendum: "You may not use the software in connection with any site that disparages Microsoft, MSN, MSNBC, Expedia, or their products or services...." Yikes!

COVERING THEIR ASS Besides committing the atrocity of using "'n" in its product name, Stomp Software, maker of *Click 'n Burn*, also goes out of its way to make sure it's not held liable for accidental death or mayhem brought about by use of its CD burning software: "The Stomp Software is not fault-tolerant and is not designed, manufactured, or intended for use or resale as on-line control equipment in hazardous environments requiring fail-safe performance, such as in the operation of nuclear facilities... air traffic control... or weapons systems." Roger that.

NO EBAY FOR YOU! The activists at *EverQuest* online are putting a quick end to the underground Avatar market by making sure you agree not to "sell or auction any *EverQuest* characters, items, coin or copyrighted material."

NO ONE UPLOADS EVER In order to avoid the specter of too much enthusiasm for its game, Fox Interactive's *No One Lives Forever* expressly forbids uploading "...the software or any portion thereof... *including screen shots*... to the Internet for any purpose...."

EULA WITH A HEART OF GOLD It's not always bad news in end-user license agreements. While its sentence structure leaves something to be desired, MGI's *Videowave* offers this surprising allowance: "If a single person uses the computer on which the Software is installed at least 80% of the time, then after returning the completed product registration card which accompanies the Software, that person may also use the Software on a single home computer." And dig around in the legalese of Symantec's *Norton Antivirus 2001* and you'll find this charming rider: "You may not use a previous version or copy of the Software after you have received a disk replacement set or an upgraded version as a replacement of the prior version, *unless you donate a previous version of an upgraded version to a charity of your choice....*" Unfortunately, they quickly spoil the mood by adding stemly "...and such charity agrees in *writing* that it will be the sole end user of the product, and that it will abide by the terms of this agreement."

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Ask the Doctor

Symptom → Diagnosis → Cure

Have a burning PC problem? How about a burning PC sensation? We're more than happy to help you with your PC problems, but you might want to get that sensation thing checked out by a qualified sensation checker-outer. If you have PC questions, send them to **doctor@maximumpc.com**. Just remember: We can't answer every e-mail. Oh, *no*—not by a long shot.

While the Plextor 24/10/40A was the RAW-mode burning champion for a brief time, a recent firmware upgrade put an end to that distinction.

Dual CPUs in Windows ME?

Do you know of any way to get Windows ME to recognize the second CPU on a dual-CPU motherboard? I know that Windows 2000 Professional will. I don't want to go that way except as a last resort.

—DALE CHAPMAN

Unfortunately, because Windows ME is based on the Windows 95 kernel, which was never intended for multiple CPUs, you are completely out of luck unless you upgrade your OS. Not only does Windows ME support just one processor, but you can't even upgrade to Windows 2000 from ME. The good news is that upgrading to Windows XP Professional will enable that second CPU.

Ow! My Freakin' Eyes!

I'VE BEEN HAVING PROBLEMS WITH MY PC, AND I DON'T KNOW WHAT'S HAPPENING WITH IT. SOMETIMES WHEN I'M WORKING ON IT OR ON THE INTERNET, IT GOES DOWN ON ME. IT FREEZES OR THE DESKTOP TURNS BLUE AND A MESSAGE SAYS THERE'S A PROBLEM. WHAT SHOULD I DO?

—FERNANDO TORRES

"The use of all caps can lead to headaches, nausea, and even vomiting."

What kind of problem does the error message say you're having? Wait—we'll guess! "You are in violation of the golden rule of e-mail—do not type in all caps. The use of all caps can lead to headaches, nausea, and even vomiting. Please cease and desist. Your system will now shut down."

But seriously, if you're having problems with your PC and tech support is blaming everyone else, there are a lot of resources out there for you and a lot of smart people who are willing to help—newsgroups, forums, and of course, *Maximum PC* are just a few of the places you'll find advice. But in order to get assistance from Geek Samaritans, you should keep a few points in mind:

- **When asking for help, make sure to include as much information about the problem as possible: the kind of PC you're using, the operating system you're running, the particular software that seems to be causing the problem (including the version), and the exact error message you are receiving.**
- **Try to put the problem in context. Does it happen only when you're online? Did you recently install any new hardware? Did lightning strike your home yesterday?**
- **Do not type in all caps. More likely than not, your message will be ignored and your pleas for help will go unanswered.**

The Burners Get Burned

I have seen several articles in which you suggest RAW-mode copying to duplicate commercial CDs. What is RAW mode, and which burners have this capability? I have several games I'm afraid I will damage, but I can't successfully copy them with Roxio's *Easy CD Creator.*

—PAUL DAVIDSON

Each sector on an audio CD holds 2352 bytes of data, but each sector on a data CD, like the game discs you're trying to copy, holds 2048 bytes of data. The leftover 304 bytes are used for addressing, synchronization, and error-correction. It's that last element that can cause you problems if you don't copy in RAW mode, which produces an exact, bit-for-bit duplication of the CD.

Many game manufacturers deliberately insert bad data into the error-correction portion of a disc's sectors to thwart copying attempts. If your burner isn't capable of RAW-mode reading and writing, these sectors are perceived as flaws and corrected during the duplication process. When you try to fire up the copy, the application checks for the original, uncorrected data but can't find it; as a result, you have a new coaster.

In order to copy a disc in RAW mode, you need a CD burner capable of RAW-mode reading and writing and software that supports RAW-mode reading and writing. This will produce a virtually identical copy.

It's true that most CD burners made in the last couple years support RAW-mode reading and writing, and applications such as *CloneCD* and *BlindWrite* are able to take advantage of this mode. But while it's technically legal in most circumstances to make a backup for your own personal use, manufacturers are not obligated to make it easy or even possible. And they don't. A good RAW mode drive from Plextor, TDK, or Yamaha can spit out dupes of older copy-protected titles, but new protections, such as SafeDisc2, use more sophisticated techniques like sector scrambling and EFM encoding to protect a disc's contents. And every time a drive comes out that can defeat the newer protections, you can bet that a scheme to foil it will soon be introduced. So the only way to be sure you can copy every disc out there is to buy every new burner and upgrade your RAW-mode copying software to every new version as it's released.

You can still find on the Internet "fixed executables" for most games that will allow you to play them without the original discs, but the halcyon days of disc-duping are pretty much

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over. It's a good time to start taking better care of your discs.

Oh Where, Oh Where Has My Extra RAM Gone?

I installed a new motherboard (MSI K7T Turbo pro) with an AMD 1800XP, and added 512MB of memory to the existing 256MB for a total of 768MB. The initial boot tests all the memory, but when Windows ME starts, it says I have just 256MB. How did Windows lose 512MB of memory, and how can I help the OS find it?

—DAMIEL BUREJSZA

This is indeed a puzzler, as normally Windows will recognize any memory the board posts with. The first thing you should do is reseat or reorder the memory in your system. The second thing is to download the latest BIOS for your motherboard. The third is to consult your motherboard manual and motherboard manufacturer's web site for the proper memory configuration. In the old days, you had to have a specific size of memory module in a specific slot. Today, you rarely have to worry about where to put memory, but when you get into the 512MB range, there can be issues.

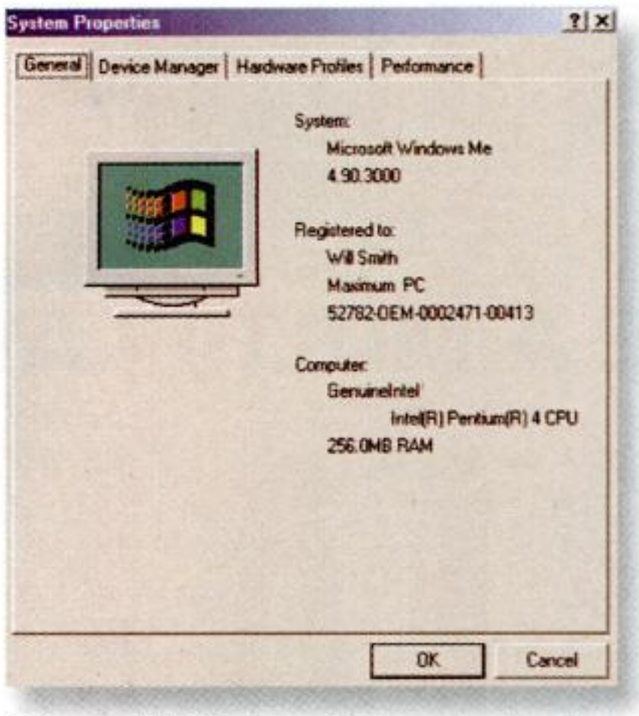
It's possible the board is certified for only a specific 512MB module, or can't work with one at all. And to confuse matters even more, many motherboard manufacturers never update older manuals, so even though the board will work with larger memory modules, the manual may not reflect this. Finally, the 512MB may not work with the 256MB module you have in your board if the timings are not compatible. Are you sure it's all PC133 memory or that it's all non-ECC memory? Try running it with the 512MB module alone and see what happens.

Great Balls of Fire!

I just built myself a new system. It has an Athlon 700 proc, a 20GB hard drive, 256MB of RAM, and a GeForce2—nothing spectacular. I just wanted a second computer on my network that would be decent for gaming. After assembling everything, I turned on the computer, and POOF! Smoke and a weak flame shot out of my AGP slot. I quickly disconnected everything and put the computer outside to cool off. Is there anything salvageable from this system?

—CHRIS THAYER

Sweet bejesus! If indeed flame and smoke came shooting out of your AGP slot, it's more than likely your motherboard and graphics card are DOA. Before you try salvaging anything, the first order of business is to find out what caused the mishap. Was it, perhaps, an improperly inserted AGP card into an AGP Pro slot? Was it a screw or piece of metal that fell onto the board or into the slot when you fired it up? Was the power supply faulty? If you want a snap decision on what likely survived in your system, the Doctor guesses that the hard drive, floppy, and CD-ROM are probably OK (assuming a bad power supply didn't just blow up the entire machine). The memory is probably OK, as well. If you had a NIC or soundcard in the box, it's also probably OK. The Doctor wouldn't trust the present state of the power supply, motherboard, or AGP card; however, an associate shorted out an AGP card in a similar inferno, and both the power supply and motherboard lived. Sadly, the graphics card didn't make it.



Why would Windows ME overlook extra RAM? Our guess is your mobo doesn't support the 512MB modules you bought.

"Sweet bejesus! If indeed flame and smoke came shooting out of your AGP slot, it's more than likely your motherboard and graphics card are DOA."

THE WINDOWS XP SECTION

Since the October 25 launch of Windows XP, the Doctor has received several dozen questions about Microsoft's new OS. Here are a couple of the best ones we received this month.

Compatibility Conundrum

I built a new, faster computer. According to the WinXP *System Checker* that came included on the November Maximum CD, XP does not support the Highpoint HPT366 Ultra DMA controller. It says it's a blocking issue. My motherboard manufacturer says nothing about support for XP. I guess I have to buy another mobo to run XP because I don't have driver support. Can you put a compatibility list on your next CD-ROM to help people who are stuck with slow modem connections.

—LYNN

Keep in mind that the system checker is very conservative in support. Although the compatibility checker says Windows XP won't run with some pieces of hardware, after installation, the hardware does sometimes work. Be that as it may, XP-certified drivers are probably behind schedule for your motherboard manufacturer. The Doctor recommends that you move your hard drives to the other primary and secondary IDE channels on your mobo until XP drivers are published by your board maker. Buying a new motherboard at this time may not yield better results, as most products continue to ship with only Windows 2000 and Windows 9x drivers.

A Burning Problem

A couple weeks ago, I bought a new powerhouse PC with Windows XP installed. A lot of my use consists of writing CDs. Apparently XP doesn't allow CD writing. I've installed and uninstalled *Easy CD Creator Platinum 5.0, Nero 5, Digital CD Recording Studio II, Music CD Recorder, Dart Pro 98, MusicMatch 6, Siren,* and *Pyro,* none of which worked. The message from Windows was always that CD recorders may make the system unstable, so the troublesome driver is being disabled. This in essence prevents writing CDs. What gives?

—WILLIAM J. POWELL

We've tested the most recent versions of *Nero* (5.551) and *MusicMatch Jukebox* (6.10.0225) and had no problems with burning. At press time, Roxio didn't have an update available for *Easy CD Creator 5.0,* although one is expected at any time. As for the rest of the apps you mentioned, it's up to each individual software vendor to support Windows XP. If they choose not to, then you could be out of luck. ■

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How To... A step-by-step guide to tweaking your PC Experience

CREATE A MULTIPLAYER LEVEL FOR HALF-LIFE

BY TIM "WALDO" HOLT AND THE *DAY OF DEFEAT* TEAM

So you want to be a mapper? You've played dod_caen a hundred times and keep thinking you could do better. Or maybe you've just seen episode three of "Band of Brothers" and are thinking, "Man, it would be kick-ass to play head-to-head on the streets of Carentan!" You've got an idea, but you don't know where to start. Well, that's where we come in. Read on, potential mapper, and learn everything you'll need to get started on building your own multiplayer level for *Half-Life*.

The Basic Premise

Not sure if you're wily enough to build your own map? Well, here's a summary overview of the basic operating procedures:

Half-Life maps are created using a map editor. Game designers (aka "mappers") use the editor to lay out brushes (solids shapes such as cubes, cylinders, pyramids, etc.), which form the walls, floors, ceilings, and other "solid parts" of a map. These brushes are then painted with textures that make the solid objects look like they're made of brick, concrete, dirt, wood, etc. After the brushes are placed and textured, the mapper places lights and entities in the map. Lights simply control the relative lightness and darkness of different areas, but entities are a bit more complex.

Entities are what add interactivity to any map. Doors that open, switches that flip, lights that turn on and off, moving platforms, transparent windows, objects that break when shot or touched, ladders, and even the glowing haze around lights are all entities. Entities are also used for objects like the flags in *Team Fortress* and the Axis and Allied start points in *Day of Defeat*.

Once the mapper has placed the brushes, textured them, lit the map, and created entities, it's time to compile. Compiling is a necessary (and sometimes long) process that converts the map into a special format (a BSP file) that can be loaded by the *Half-Life* game.

Now that you know the basics, fire up your web browser and get ready to download all the stuff you need to get started.

The Mapper's Toolbox

Half-Life map editors are very similar to CAD programs, such as *AutoCAD*. They allow you to place all the brushes, entities, and lights in your map and tell them how to behave.

Worldcraft (see the screenshot in Figure 1) is probably the most well-known editor for *Half-Life* maps. It's officially authored and supported by Valve, so you know as *Half-Life* grows and becomes more advanced, so will the editor. While there are other editors, you can't go wrong with *Worldcraft*. Get the latest version from **www.valve-erc.com/content/?page=utilities**.

But wait, there's more. You'll also need a set of map com-

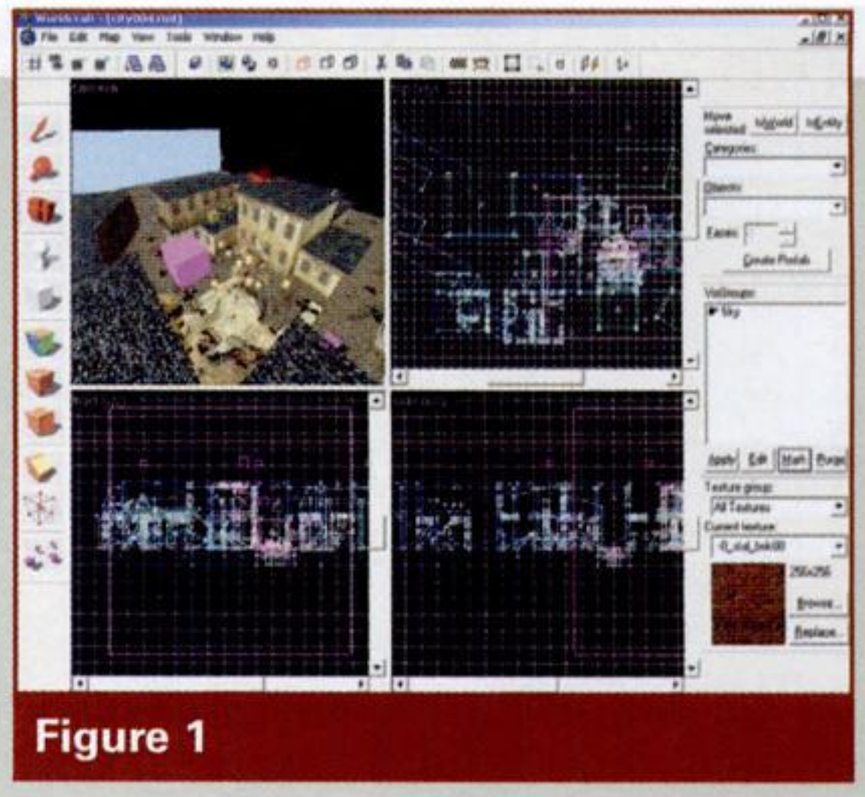

Figure 1

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piling tools. While a set does come with *Worldcraft,* the ones you want to use are Zoner's tools (also called *Zoners*). "Zoner" is a developer for Gearbox who has greatly improved the standard map compiling tools, making them faster, better, and much more powerful. Get the latest version of *Zoners* at **www.valve-erc.com/content/?page=utilities.** And if you want to create custom textures, you'll need an image editor such as *Photoshop* or *Paint Shop Pro* as, well.

Get Some Inspiration!

OK, you've got *Worldcraft* and you've installed *Zoners.* Now you just need to decide what shape your map will take.

First step: Explore as many maps as possible! Not online with other players, but rather by yourself in a LAN game. Walk through the map and note what works, what doesn't, what you like, and what you don't like. And don't just play the most popular maps for any given mod. Play lots of custom maps; play the very worst dogs. It's playing the dogs that gives you insights like, "Man, the lighting on this map sucks! It's way too dark!" or "That building looks so fake. It needs some windows." Knowing what makes a map suck can help you avoid creating your own sucky maps when it's time to get your hands dirty.

You can also check out books, TV, the web, movies, and everyday life for ideas. *Saving Private Ryan* and *Enemy at the Gates* were the inspiration for many *Day of Defeat* maps. And online, there are literally dozens of web sites devoted to the German bunkers of WWII, for example, and they're crammed with photos, drawings, and even floor plans.

Once you have a concrete idea, it's time to lay the first brush.

Brushwork

When you load *Worldcraft* for the very first time, remember to keep your goals simple. You might have grand ideas of a huge, old town with hundreds of buildings to explore, a massive beach with crashing waves, and an expansive canyon with twisty roads on cliffs, but if you've never mapped before, you'll probably end up quitting before your entire vision is realized, or with a map that features just a half-baked hodgepodge of what you originally planned. After all, any schmoe can *imagine* a grand, detailed environment, but it takes a special kind of person to spend 40-plus hours creating that environment in *Worldcraft.*

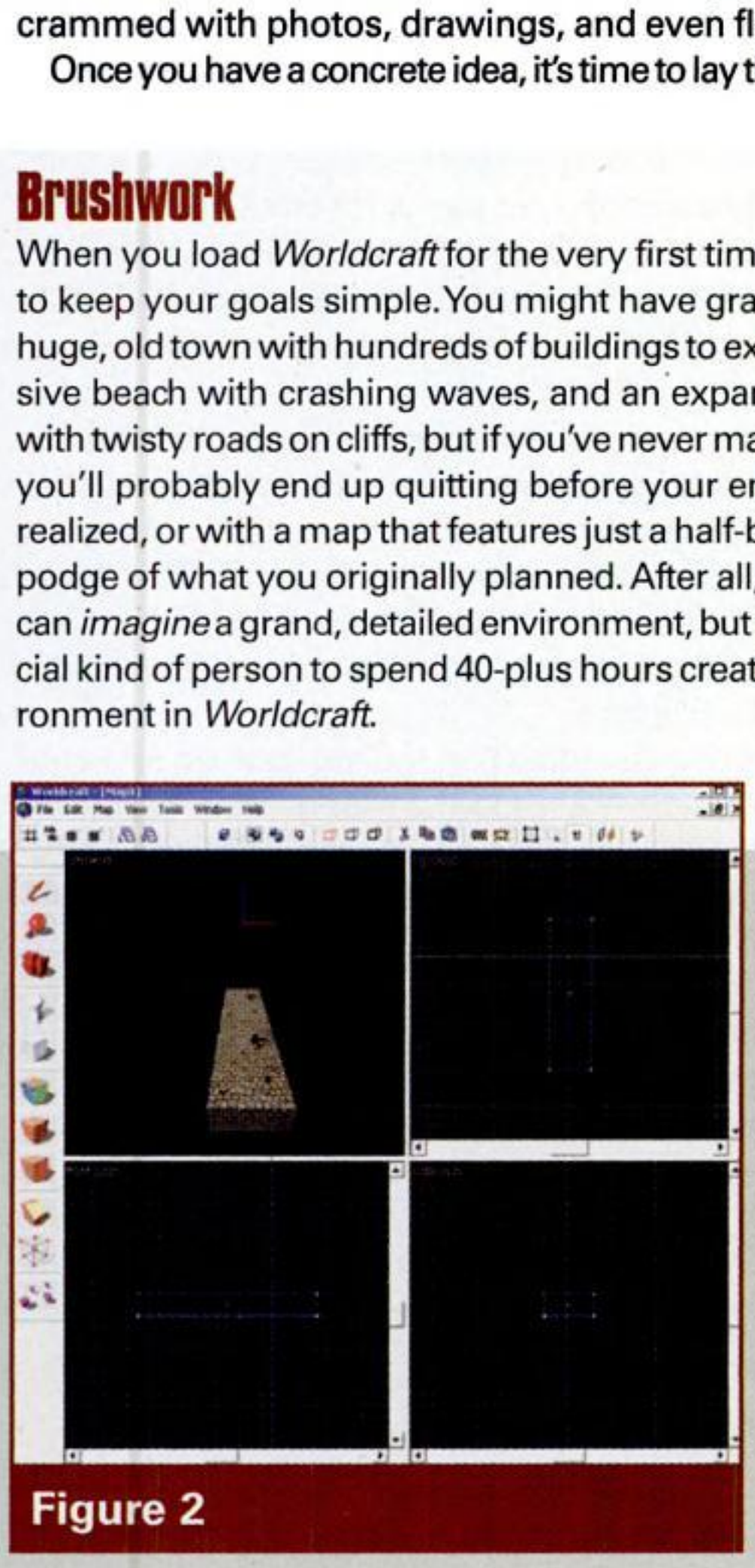

Figure 2

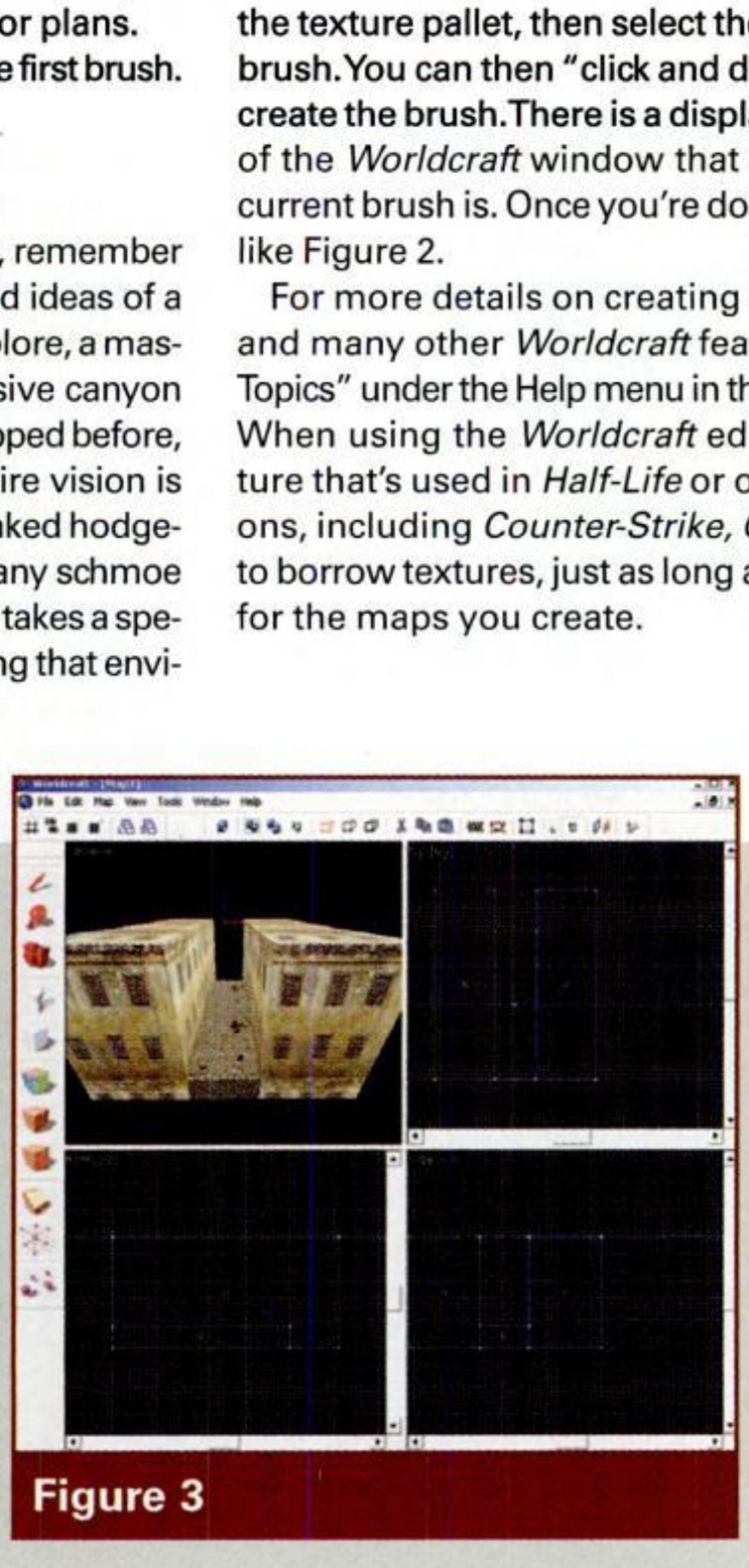

Figure 3

The key is to start with something simple, like a short street with a building on each side. Don't worry that the map just "ends" and the player can't walk down the street—you can take care of that later. When you're happy with that one little part, then add some more. Let your maps grow in stages. Make sure you save and test frequently. It's much easier to find and fix a problem in a small map than in a huge map.

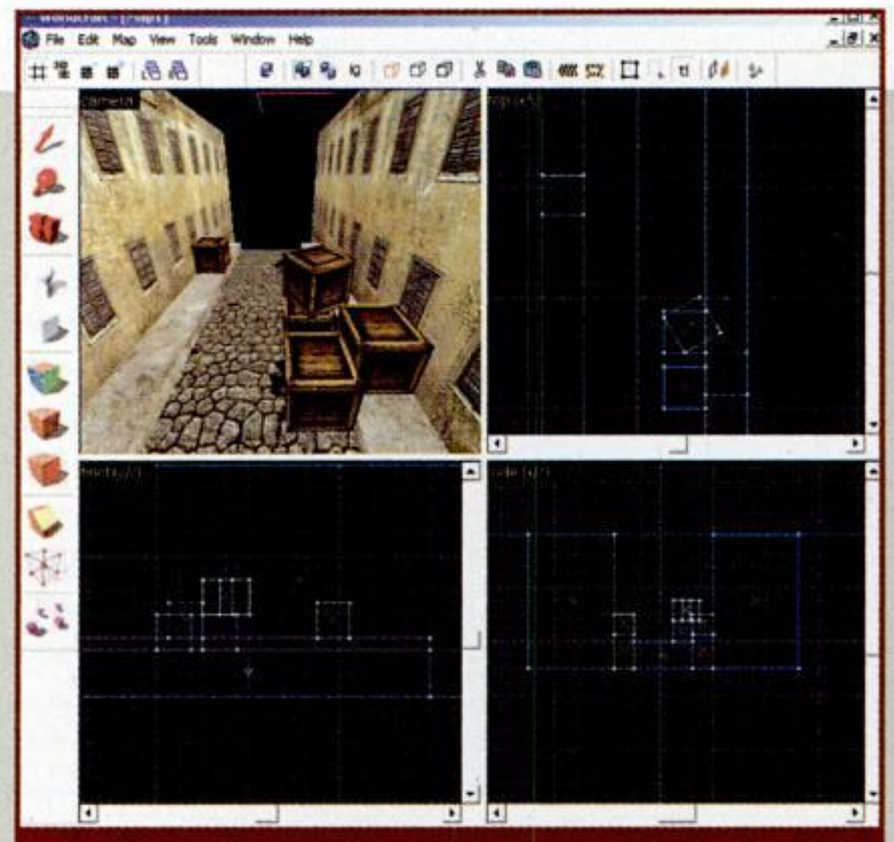

Figure 4

Now, let's open up *Worldcraft* and begin building a simple city street. Our goal will be to make a street about 12 feet wide and 50 feet long, then line it with tall buildings. Unfortunately, *Worldcraft* doesn't work in feet (or even meters), but rather in "units," so we'll have to do a little math here. One unit equals approximately one inch, so to create a 12- by 50-foot street, we'll want it to be about 144 units wide and 600 units long.

To make this brush, first select a "cobble" texture from the texture pallet, then select the "BlockTool" to create the brush. You can then "click and drag" with the brush tool to create the brush. There is a display in the lower right corner of the *Worldcraft* window that will tell you how big your current brush is. Once you're done, your brush should look like Figure 2.

For more details on creating brushes, picking textures, and many other *Worldcraft* features, check out the "Help Topics" under the Help menu in the program. And remember: When using the *Worldcraft* editor, you can use any texture that's used in *Half-Life* or one of its commercial add-ons, including *Counter-Strike, OP4,* and *BlueShift.* It's OK to borrow textures, just as long as you don't charge money for the maps you create.

Taking Shape

Now that we've got a street, let's put buildings on either side. Select a good wall texture from the texture pallet, then create two large brushes on either side of the street. The results should look something like Figure 3.

Our little street is coming together! But it's still a bit bland. Because no shooter is complete without crates, we'll add some.

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Crates are always easy to make, and they serve as good cover for players. Again, pick a texture (a nice cratey one this time), and use the brush tool to make a crate. To make things go a bit faster, copy and paste the original crate a few times. And to add a little variety, rotate one of the crates a bit.

Of course, no street is complete without sidewalks. To put sidewalks in your map, just select and move the two buildings about 48 units away from the street, then create two new brushes with a concrete texture in the gaps. Once the crates are in place, your map should look like Figure 4 on the previous page.

There are only 10 brushes and four textures in the map, yet it's already looking like something. If you're not sure what you're looking at in the different 2D views in Figure 4, see Figure 5 for specifics. But this is just a beginning, because obviously what we've built so far couldn't work as a complete map. It's too small, and it hasn't been closed off by sky brushes. To close off the map, select the sky texture and create a brush that covers the top of the street (touching the tops of the buildings), and one at each end to block off the street. After you've tested this portion of the map, you can create new areas that will connect to either end of the street.

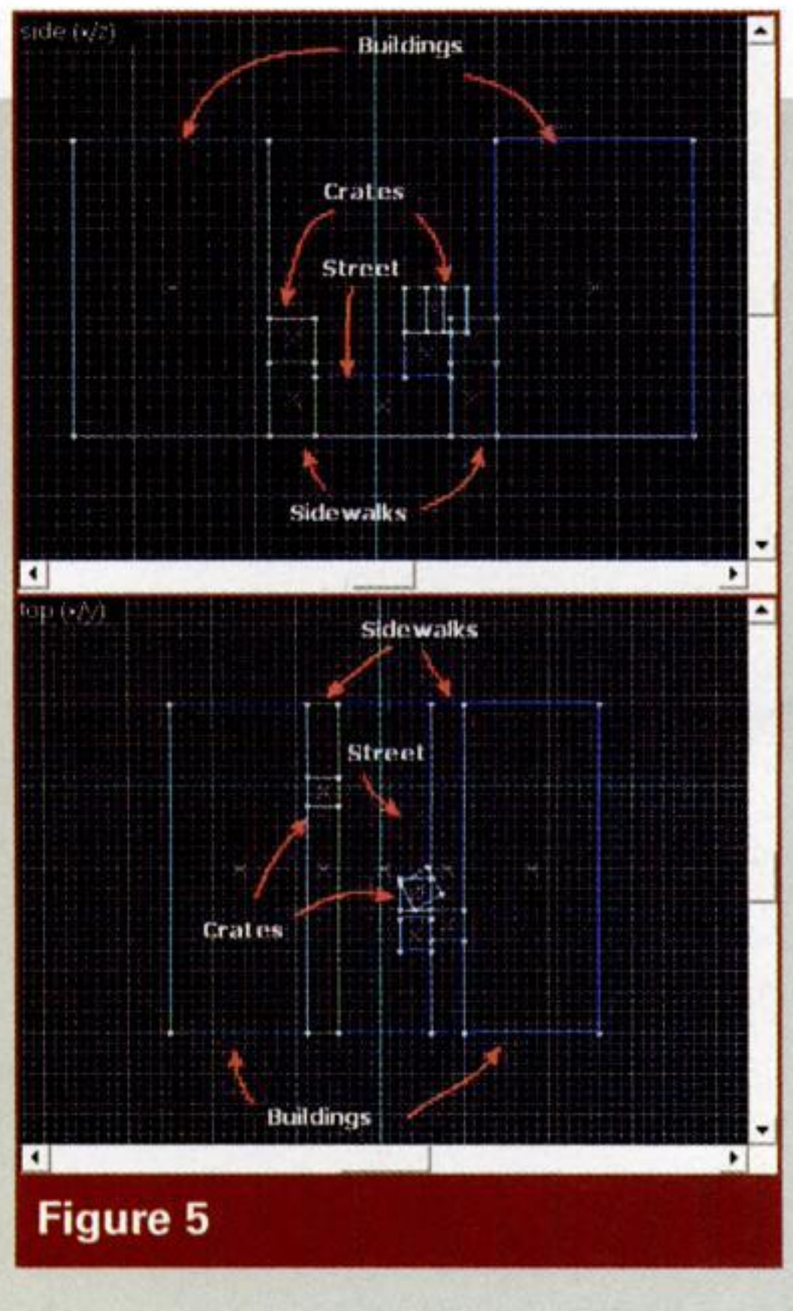

Figure 5

Setting the Mood

Now that you've finished a basic layout, you need to touch up the details. Textures, sounds, and lighting do as much to create a mood for your map as does the actual layout of the level. Factories are noisy. Caves are dark and wet. Ruined cities are gray and eerily silent. Creating a backstory for your map, then using that story to fill in details, is what makes a map feel like a realistic location.

Keep this in mind when you're creating a map, and if you haven't yet done so, listen to the sounds in the "sounds" folder of *Half-Life*. You'll hear everything from the sounds of birds chirping to dripping water to explosions. Keep those sounds in mind when you develop your map. If your map is outside, have birds chirping. If there are lots of machines in your map, have them click and hum. Attention to these little details really pays off in the end.

Lighting the Lights

There are four types of lights in *Half-Life*–based maps: point, spot, texture, and environment. Each type of light has different properties (such as color, direction, and intensity) and can be used for different things. Without lights, your map will be pitch black, so you definitely want to spend some time working on the lighting.

All lights have two common properties: color and intensity. Though a little confusing at times, *Worldcraft* refers to this combination as the lights' "brightness." The color defines what color the light shines, be it red, green, blue, yellow, gray, white, or what have you. The intensity determines just how brightly the particular color shines.

Colors are always specified as an "RGB" value, where R, G, and B stand for red, green, and blue, respectively. The relative amounts of R, G, and B in a light define what color it will appear as. Luckily, *Worldcraft* gives you a handy tool for defining colors (see Figure 6).

RGB values, as well as intensity, are specified using a number from 0 to 255, where 0 indicates no color (or no intensity), and 255 indicates as much color as possible. For example, a very bright white light would have the RGB values [255, 255, 255] and an intensity of 255. A dim green light might have RGB [0, 255, 0] and intensity of 20.

Four Important Points

There are four basic types of lights available to the mapper in a *Half-Life* map: point, spot, texture, and environment.

■ **Point lights** are lights that come from a single, specific point. When you look at one in-game, you won't see any physical light source, but you'll notice that light radiates forth. Point lights have two special features that can make them extremely useful: They can be turned on and off during a game, and they can flicker. If you want a light that is turned on and off with a switch on the wall, you'll want to use a point light. If you want to make an area look as if it is lit up by a burning flame, you'll want to use a point light set to flicker like a flame.

■ **Spot lights** are more or less identical to point lights, but they shine their light only at specific target spots on a map. As you might expect, they're useful for creating a "pool of light" about an area, such as under a streetlamp. You won't be able to see the "beam" of a spotlight, but you'll be able to see the spot of light on the target surface.

■ **Texture lights** are special combinations of lights and textures. Certain textures (their names often start with a "+" sign) will automatically radiate light when placed in your map. For example, the texture "+0~FIFTS_LGHT01" looks very much like a fluorescent light fixture. If you texture one side of a brush in your map with this texture, it will automatically radiate light.

For a full list of all textures that radiate light, go into your Half-Life\Valve directory and look for a file named "lights.rad." For a good tutorial on using textured lighting, go to: **http://countermap.counter-strike.net/Tutorials/tutorial.php?id=48.**

■ **Environmental lights** are designed to simulate natural outdoor lighting. When creating a map in which the player can see outdoors, you'll end up using a special texture called "sky." You'll be able to have that sky give off light by adding a light_environment entity to your map and specifying a brightness for it (RGB plus Intensity). All sky textures in the map will radiate this light, nicely simulating the look of sunshine (or moonlight).

Placing Sounds

If you check the sounds folder in your Half-Life/Valve directory, you'll find dozens of sounds. Any of these are fair game

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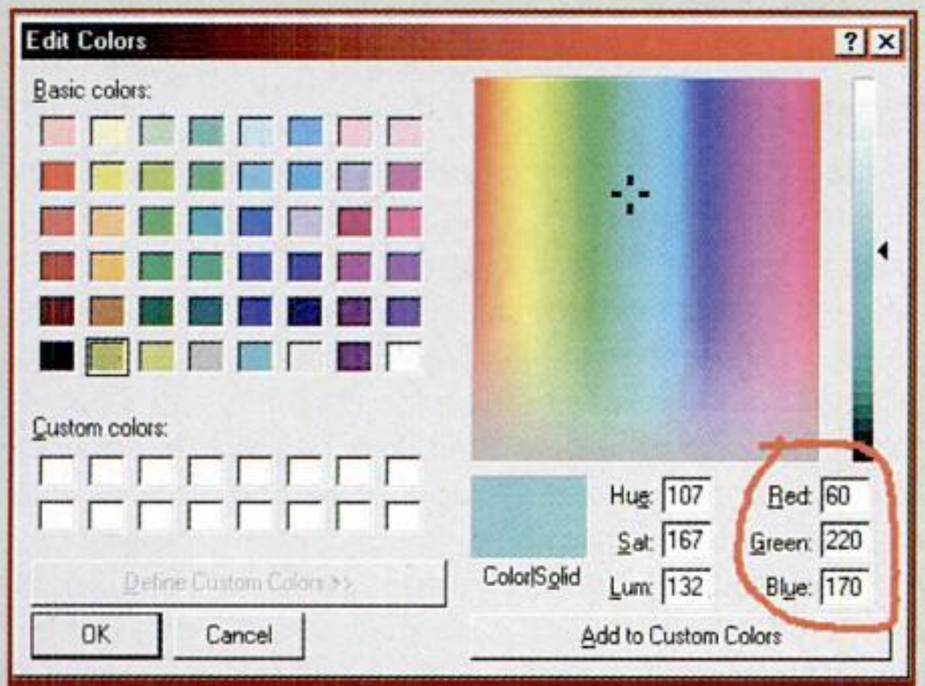

Figure 6

for use in your map, so you should definitely have a listen to all of them. You can use *Winamp* or another audio program to listen to the WAV files. Ambient sounds include everything from chirping birds to distant gunshots and are easy to place inside a map.

The key is to choose *appropriate* sounds in moderation. If the player is outdoors in a forest, then the sounds of crickets and birds are appropriate. If the player is in a dark and damp sewer, then you might use the sound of dripping water. *Half-Life* includes ambient sounds for almost any environment.

Sounds are placed in your map by using a special type of entity called an ambient_generic. An ambient_generic is a fixed point that radiates sound, and each ambient_generic can play one sound. There are several important parameters you'll want to set for each ambient_generic, including the volume of the sound and whether the sound should play by default, loop, or play once, and how far away from the entity a player will be able to hear the sound (see Figure 7). Similar to lights, sounds may be given names and triggered to turn on or off. They can also be set to play all the time.

Compiling Your Map

Before your map will work in *Half-Life*, you'll have to compile it. Compiling takes your editable .map format and spits out a highly optimized format—a .bsp file—that the game engine can digest. More specifically, compiling breaks your map into small sections (which helps *Half-Life* run it efficiently) and works through all the intensive calculations that give your map realistic lighting. The compiler also reports any errors that would keep the map from working properly in *Half-Life*.

If you haven't done so already, go to Valve's ERC web site Utilities page (**www.valve-erc.com/content/?page=utilities**) to get *Zoners* compiler tools. Along with the programs, you'll find a full set of documentation. While you're there, you should also pick up a compiler front end to help you with the process. These are very helpful tools that keep you from having to deal with many of the complex options available with *Zoners*. *Worldcraft* has a built-in compiler front end, but it's outdated and should be avoided.

Compiling can take a long time—perhaps many hours—if your map is complex. To speed up your compile time, you'll want to shut down any unnecessary programs (including *Worldcraft*) on your PC while compiling.

Take a Leak, and Fix It

Eventually every mapper encounters a leak—a "hole," if you will. Unfortunately, *Half-Life* doesn't like leaks. Leaks won't keep the map from running, but leaky maps will be lit up brighter than day, and you'll have extremely low frame rates on even the fastest machines. You should never, ever distribute a map with a leak in it. Leaky maps are broken!

So what exactly is a leak? The best way to get your brain around the idea is to imagine a map as a spaceship. Like a spaceship, a map must be completely sealed shut to ensure "environmental purity." Every map you ever play in *Half-Life* is finite and sealed. There is no "beyond." Oh, you can see the sky, but it's just a textured brush. Except by enabling cheats or flying around when you're in spectator mode, there is no way to get "outside" a map.

Leaks occur when the map compiler can trace a line from any entity in your map to the outside of your map. This trace is saved in a file called a pointfile. Loading a pointfile in *Worldcraft* shows all the unpleasant red lines you see in Figure 8. There are three basic types of leaks: large, small, and "not very obvious."

Large leaks usually occur when you've completely failed to add a brush over an area of your map; it's like failing to put a roof on a building. These leaks are often easy to find, as simply examining your map in *Worldcraft* will show you the gaps.

Small leaks occur when you fail to bring two brushes together, leaving a tiny gap. Remember, any gap, no matter how small, that leads to the "outside" of your map is a leak. Some leaks are so small, you can barely see them. This can make these leaks rather hard to find.

"Not very obvious" leaks are the most difficult to find. These are the kind that can make you tear out your hair and completely throw away a map and start over. What causes them? In some cases, you might have a brush on the outside of your map that's an entity brush, such as a door or a special "func_wall" brush.

You'll know you have a leak when you compile your map

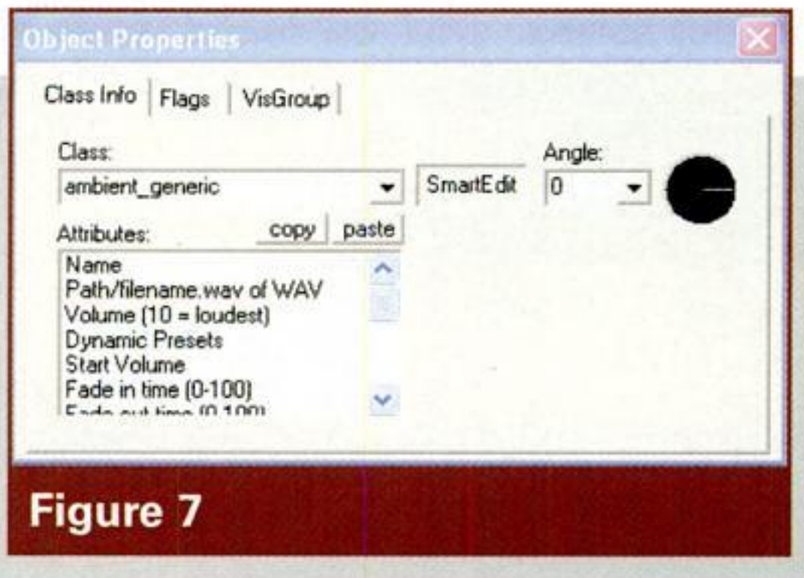

Figure 7

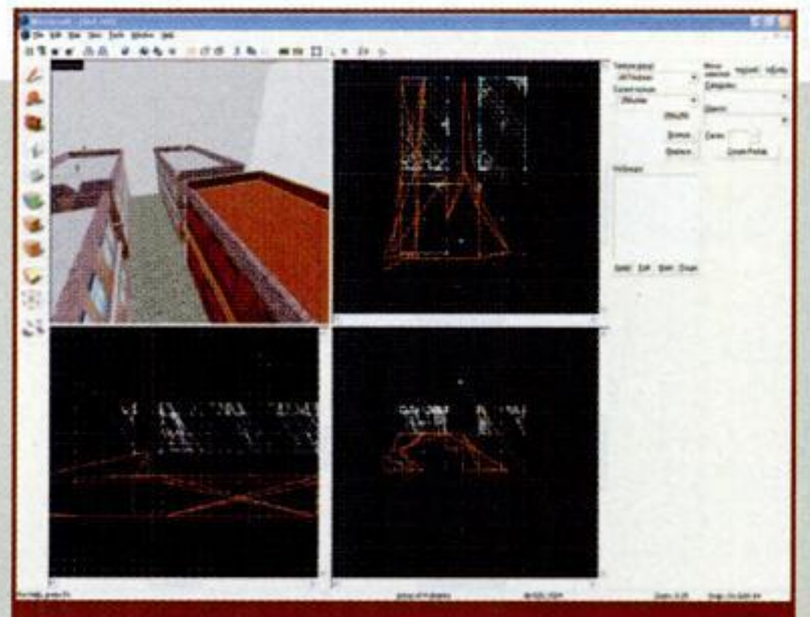

Figure 8

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and see the dreaded "LEAK LEAK LEAK" message from the BSP compiling program. The compiling process will stop running when it finds a leak.

So what do you do when you have a leak? Sometimes you can find leaks just by visual inspection of the map in *Worldcraft*. Cruise through the map in the 3D view and look around. Check places where brushes meet around the "edges" of your map. Watch for gaps, small or large. Did you not have a leak in the previous version of your map but you do now? Examine the areas where you've made changes. Also, be aware that your map may have more than one leak.

Another trick for finding leaks is to create an extremely large brush that encloses *half* of your map, then compile again. If the leak vanishes, then you know the leak is somewhere in the half of the map you have covered up. If you still have a leak, then it means there is a leak in the half of the map left uncovered. Repeat the process again, adding a new brush that covers half of the suspect portion of your map. By repeating this several times, you can isolate the leak.

Finding leaks is usually much more difficult than fixing them. Fixing small leaks is usually as simple as stretching one brush to cover the gap. Larger leaks may require you to add new brushes to close holes.

There is one last technique for fixing leaks—it's not encouraged, but is available as an absolute last resort: Almost any leak can be fixed by enclosing your entire map in one big, fully sealed box. This will fix your leak, but it will also make the compile time on your map go way up. It will also make your map run slowly, and other mappers will laugh at you. Would you put a large plastic tarp around your house to fix a leaking roof? Placing a big box around your map is the mapping equivalent of that act.

The best way to fix leaks is to avoid creating them in the first place. Create your map in sections, and test each section individually before you connect them. That will help you eliminate leaks before they form.

Balancing Act

One thing that's important to consider when making team-oriented maps (such as *Day of Defeat*) is that balance between the two teams is vital. Each team should start out on a relatively equal footing in the game so that neither team has an inherent advantage or disadvantage. Most maps should also have bottlenecks—that is, places where paths come together and where the action will likely happen. Bottlenecks give defenders a place to set up a last stand, as well as a place for people on the offense to concentrate their attack. If you've played *Counter-Strike*'s popular "Dust" map, you'll know that the hallway and underpass are the two bottlenecks in the map.

Extensive testing of a near-complete map prior to release can tell you the most important thing about you map: whether it's fun!

Closing the Leak (In This Article!)

We've given you enough to get started, but there's a lot more to mapping than what we've covered here. If you want to know more, check out these resources:

- *Worldcraft*'s built-in Help
- Valve's ERC site: **www.valve-erc.com**
- 69th Vlatitude: **www.vlatitude.com**
- CounterMap: **http://countermap.counter-strike.net**
- Gamesnet.net IRC, in the channels #dod, #mapcore, #countermap

THE MAN BEHIND THE MAPS

Tim "Waldo" Holt is part of the core *Day of Defeat* team. He started with *Team Fortress* for classic *Quake*, but has been working exclusively with *Half-Life* for the past several years. *Day of Defeat* is available at **www.dayofdefeatmod.com**. If you're not playing it, you suck.

MAPPING GLOSSARY

MAP The environment, or level, in a 3D, first-person shooter such as *Half-Life*.

BSP A map that has been compiled and is ready to be played in *Half-Life*.

COMPILE The process of taking a map from its raw format (a map file) to a BSP file, where it's ready to be played in Half-Life.

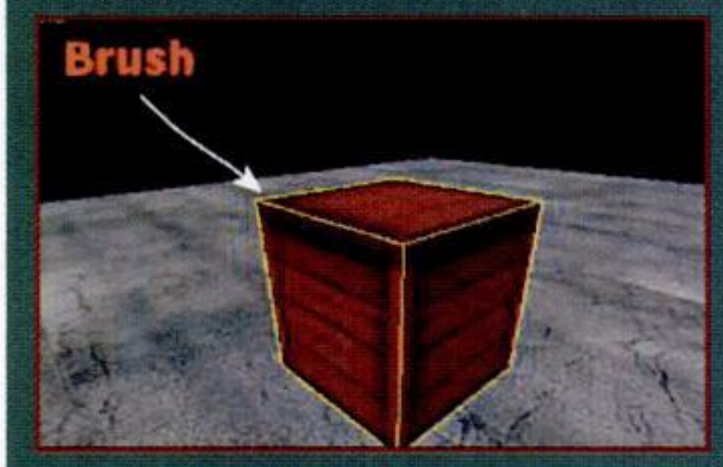
WAD A file that contains textures.

TEXTURE A single image that may be used to paint faces of textures.

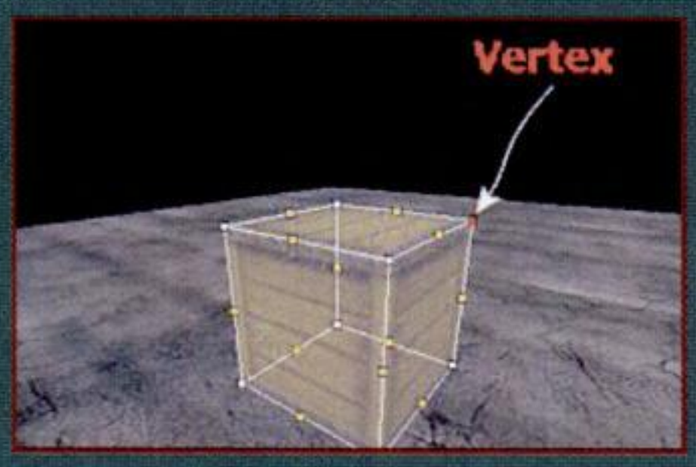
SPRITE A special kind of entity that's drawn in-game. Sprites are often used to represent the "glow" around some lights, fog, muzzle flash, smoke puffs, fire, etc.

ENTITY A special point or brush in a map that's not static.

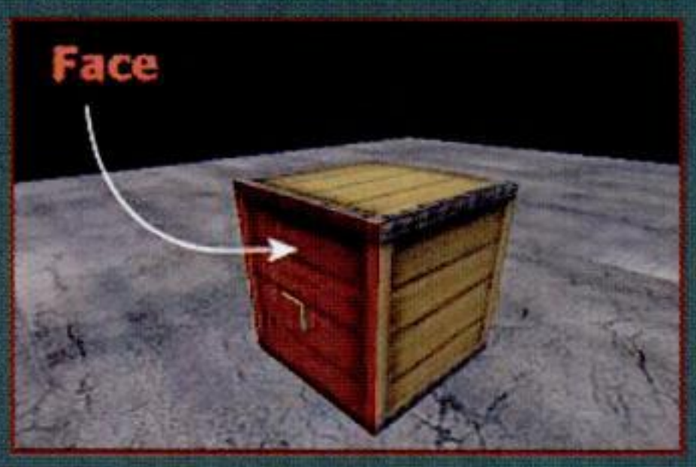
CARVE The process of cutting away one brush with another brush. This is a powerful tool that can be used to good effect, but it can also lead to bad geometry in a map.



BRUSH A single solid object in a map.



VERTEX A single point on a brush that defines its shape.



FACE One side of a brush.

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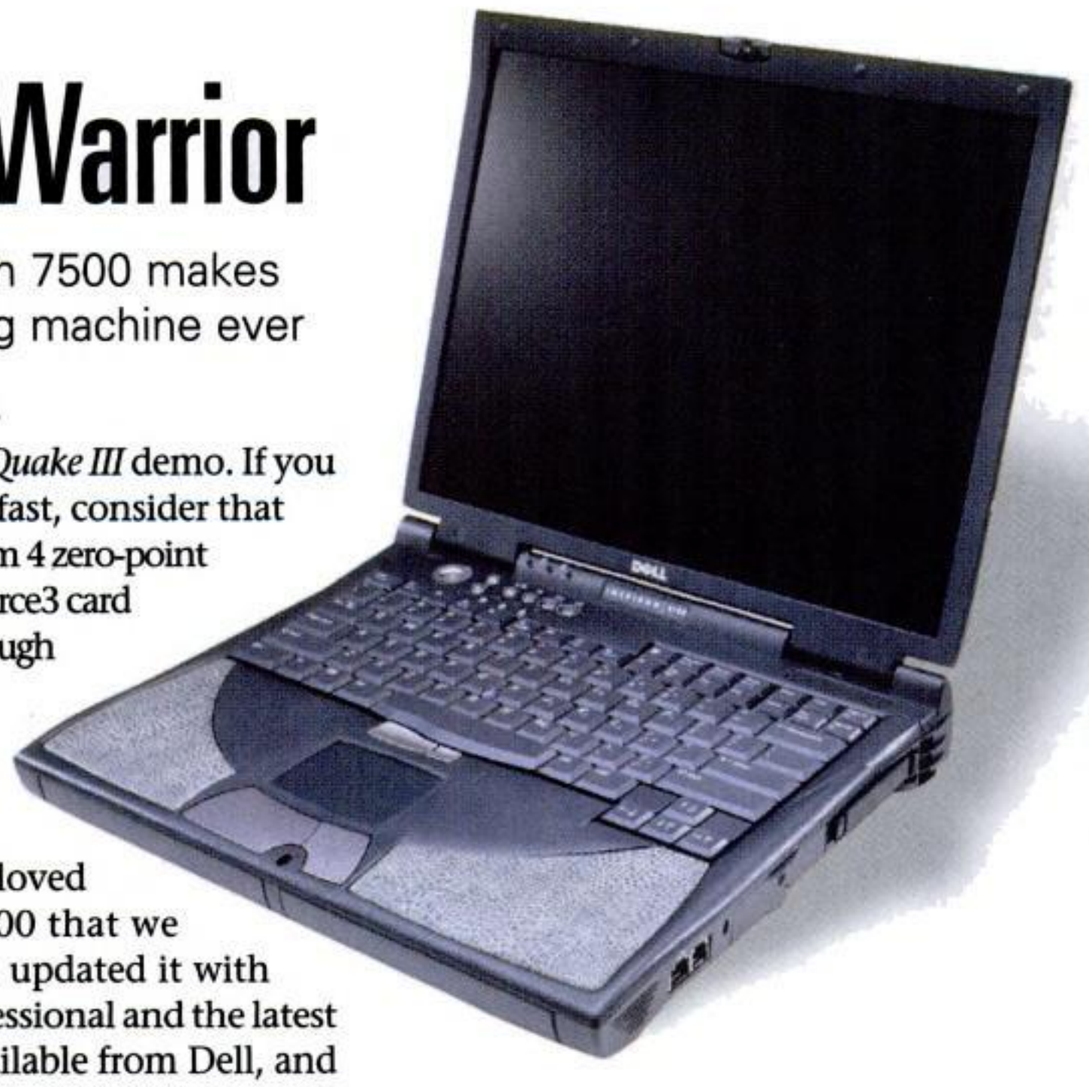
In the Lab

A behind-the-scenes look at Maximum PC testing

The New Mobile 3D Warrior

You want portable gaming? The Mobility Radeon 7500 makes Dell's latest notebook the fastest mobile gaming machine ever



Mobile gaming platforms finally received serious graphics this year when nVidia released its GeForce2 Go chip. ATI's first response, the Mobility Radeon, was far better than previous ATI mobile chips, but didn't compare to the GeForce2 Go.

That all changes now with ATI's latest mobile graphics chip, the Mobility Radeon 7500, which is based on the Radeon desktop core. This month, we take an early look at the Mobility Radeon 7500 lodged inside Dell's Inspiron 8100 notebook. This is essentially the exact same product as the Dell Inspiron 8000 we reviewed in June 2001; the 8100 simply includes a 1GHz mobile P-III and nVidia's GeForce2 Go 3D chip.

The CPU in the new 8100 is Intel's fastest mobile Pentium III, the 1.2GHz based on the 0.13-micron Tualatin core. Besides the clock speed advantage over the Coppermine P-III, mobile Tualatin doubles L2 cache to 512KB and adds a data prefetcher to gather information in the cache that it thinks the CPU will need next. Externally, the 8100 is almost identical to the 8000 except for the new faux snakeskin palm rest (remember, the Dell boys and girls are from Texas.)

The Inspiron 8100 pulled down 38fps in our punishing *Quake III* demo. If you don't think that's fast, consider that our desktop Pentium 4 zero-point system with a GeForce3 card yields just 42fps (though the zero-point isn't equipped with the latest nVidia Detonator drivers).

We took our beloved Dell Inspiron 8000 that we reviewed in June, updated it with Windows XP Professional and the latest nVidia drivers available from Dell, and compared it to the new 8100. This wasn't a pure comparison of the GeForce2 Go against the Mobility Radeon 7500, but we figured that running some gaming tests would tell us something about the 3D chips' relative power.

Overall, the 8100 was almost twice as fast as the 8000 in gaming. In fact, the 8100's *3DMark2001* score was more than twice that of its slower sibling, and its *Quake III Arena* score (at a notebook-compatible 800x600 resolution) was about a third faster. Considering how blazingly fast the original 8000 was, the scores of the 8100 are plumb crazy. Expect a full review of the Inspiron 8100 next month.

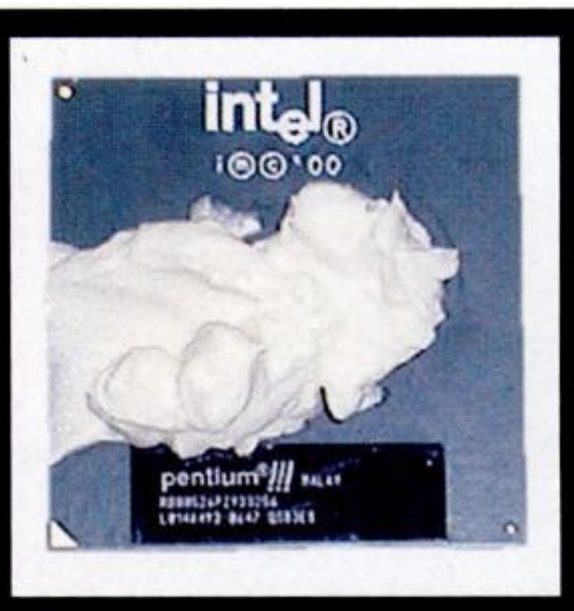
BENCHMARKS

	1.2GHz/ Mobility Radeon 7500	1GHz/GeForce2 Go
3DMark2001	3798	1848
Quake III Arena MPC Demo 1280x1024	38 fps	WNR
Quake III Demo 1 800x600	127 fps	78.9 fps

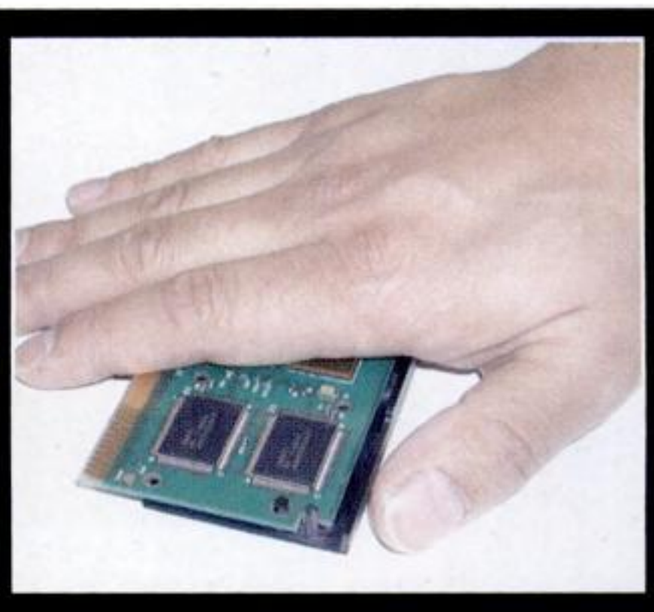
Spreading it on Thick

Drats! While we were preparing test beds for this month's Speed Trials cover story, we ran out of thermal paste at the most inopportune moment. No prob, though. Necessity is the mother of invention...

George Washington Carver was right—our friend the peanut is a versatile legume indeed.



Cream cheese—it isn't just for bagels anymore.



Senior Editor Gordon Mah Ung (aka "the human guinea pig") is always ready to take one for the team.

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Unearthed!

Lab cleanup reveals technology treasures

Last month, we showed you our brand-new testing Lab. This month, we want to share some artifacts we found hidden in the sedimentary strata of the Maximum PC dig site.

MTH MEMORY: In 1999, Intel was in a serious pickle: A 128MB stick of RDRAM cost almost four times the amount of PC100 memory. So, in order to drive adoption of its new RDRAM-only 820 chipset, Intel created the Memory Translator Hub, which translated the fast serialized signals of RDRAM to the slower parallel signals used in PC100 RAM. At one point, Intel even toyed with a small, PC100 DIMM with an MTH chip on it—the oddity pictured here. The board was to have been slipped into the RIMM slots of 820-based motherboards.

But the MTH-on-DIMM technology went nowhere, and Intel instead created motherboards with onboard MTH chips. Ultimately, bugs in the MTH forced Intel to pay out millions of dollars to recall motherboards, and the company abandoned the MTH strategy altogether. An evolutionary aberration if there ever was one.

NVIDIA'S FIRST CHIP: Our eyes bugged out when we saw this artifact—an original NV1 board! And it was still in its shrink-wrap! The NV1 was nVidia's first commercial effort, and in the form of the Diamond Edge 3D, it wasn't just a graphics product; the board actually featured support for audio and Sega Saturn gamepads. Our treasure includes a whopping 2MB of VRAM and promised "Photo-realistic 3D graphics animation for Windows 95." And, whoa, it needed a 486-66 DX2 or 90MHz Pentium to support its amazing power! The packaging included the "3D-accelerated" titles *Virtua Fighter Remix*, *Panzer Dragoon*, and *NASCAR Racing*. Considering that someone paid $2,150 for a Voodoo5 6000 card (see page 13), we're expecting a cool $5,000 for this collectors' item.

MAXIMUM PC'S PATRON SAINT: Readers of early *Maximum PC* issues and its predecessor, *boot* magazine, will fondly recall the colorful and tell-it-like-it-is writing of Senior Editor Andrew Sanchez. Andrew unexpectedly died Feb. 6, 1999. During our cleanup of the old Lab, we discovered an image of Andrew that was used to test printer quality. The pic was never used in the magazine and was eventually lost in the shuffle of graphics cards, hard drives, and other sundry crap that littered the Lab. But it does show Andrew at his happiest—at his *boot* desk, playing a game. Rest in peace, brother.

Dynamic Control's Dynamat

A powerful PC doesn't have to be loud anymore. Dynamat was originally created to dampen excessive noise in enthusiast cars, but now Dynamic Control is selling small sheets of the wonder material for use in PCs. The strips absorb much of the noise and vibration a PC kicks out. Dynamic Control says the adhesive strips' aluminum siding absorbs vibrations better than rubber. With proper placement, the company says you can cut a PC's noise by 9dB—which is a lot when it comes to PCs. *$29,* ***www.dynamat.com***

[LONG-TERM ROAD TESTING]

Bad Sectors or Just Bad Luck

THE PRODUCT: IBM 75GXP harddrive
ORIGINAL VERDICT: 9 (August 2000)

WHAT WE SAID THEN: "The IBM Deskstar 75GXP got us hot and bothered from the start. IBM's 75GXP is a monster drive for sure, with performance and size that is second-to-none. However, the presence of bad sectors on our test unit was weird, and spooked us just enough to withhold the Kick Ass [Award]."

17 MONTHS LATER: IBM is now being sued over high failure rates allegedly endemic to the 75GXP. The drive we originally reviewed has since been returned to IBM, and our experience with later units has been mixed. Several 45GB and 30GB 75GXPs used in our Lab have exhibited no problems. However, several drives purchased by editors for their own personal use have shown signs of trouble: One 75GB unit died unexpectedly, while another 75GB unit as well as a 60GB unit developed bad sectors.

WHAT WE THINK NOW: We thought the bad sector problem in our original test unit was an anomaly—but a slew of reader complaints and our own negative personal experiences make us think otherwise. Sure, many consumers have had blissful, reliable performance from the 75GXP, but we think the red flags deserve attention. If we were to re-review the drive based on 18 months of testing and user testimonials, we'd give the 75GXP a 4 verdict for its dubious reliability record.

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PC Power & Cooling Sleekline 1260

No-nonsense pizza box emphasizes work over play

It's sleek and simple but lacks audio and graphic power.

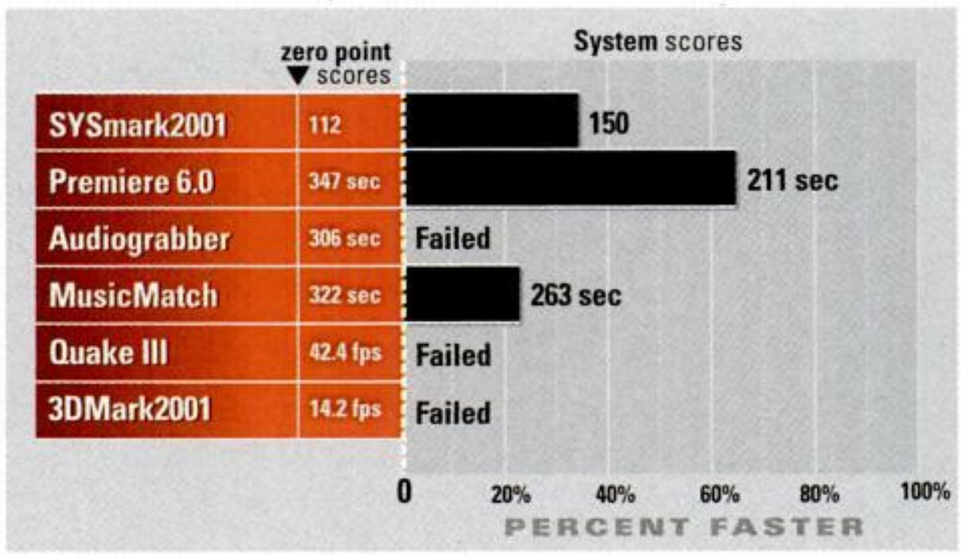
We thought of Jack Nicholson's line from *The Shining* when we uncrated the Sleekline 1260: "All work and no play makes Jack a dull boy."

It's not that PC Power & Cooling's new Sleekline is a dull machine. In fact, in some ways, the 1260 is a sexy little bugger. We dig its minimalist lines and rugged steel exterior. At our offices, for example, it's not the 1.6GHz Athlon XPs or 2GHz Pentium 4 desktop systems that get the "oh, neat" comments from visitors—it's the flat, black and bad Sleekline 1260.

Unfortunately, the 1260 lacks some vital components that we think *Maximum PC* readers need in a PC. For starters, the box desperately needs a soundcard. PC Power & Cooling says an optional audio adapter using the USB ports is the answer, but we shiver at the thought of USB audio—it sounds bad and steals system resources. Even worse, the integrated graphics in the micro-ATX motherboard's 815E chipset just can't cut the 3D mustard. Luckily, PC Power & Cooling's first PC isn't targeted at gamers, but rather at space-conscious studio dwellers and small businesses that don't want employees listening to MP3s or playing games at work—so we're certainly looking forward to an updated version of the Sleekline that features legitimate entertainment possibilities.

UNDER THE HOOD

THE BRAINS	
CPU	Intel 1.26GHz Pentium III-S (512K L2)
Motherboard	Intel S815EBM1
RAM	One 256MB PC133 DIMM
I/O ports	One parallel, one serial, four USB 1.1, Fast Ethernet
Open slots	Three PCI, two DIMM
DISPLAY	
Videocard	Integrated 815
Display	NEC 1530V
Native res	1024x768
STORAGE	
Hard drive	40GB IBM Deskstar 60GXP
CD-ROM	LG CRN-8241B
NETWORKING	
LAN	Intel Fast Ethernet (onboard)
SOUND	
Soundcard	N/A
Speakers	N/A
MOUSE	
No-name generic	
KEYBOARD	
IBM	
BUNDLE	
Microsoft Windows 2000	
BOOT: 46 sec.	**DOWN: 23 sec.**



Full benchmarking details in the Mag Reprints section of MaximumPC.com

Under the hood, the Sleekline 1260 packs an Intel Pentium III-S clocked at 1.26GHz. The "S" designates the server version of Intel's Tualatin P-III. Based on a 0.13-micron process, the P-III-S includes 512KB of L2 cache (earlier P-IIIs came with just 256K) and a few core enhancements to increase memory performance. PC Power & Cooling is actually marketing the Sleekline 1260 against faster clocked P4 systems. In this respect, the company has hit the nail on the head, as the 1260's *SYSmark2001* scores put even 1.7GHz P4/RDRAM machines to shame. Not bad for a P-III system that uses PC133, eh? Certainly, as an office box, the 1260 is a winner.

By adding a second angled-LAN card, the Sleekline can also perform server duties. In fact, PC Power & Cooling says it's a snap to stack five or 10 Sleeklines together in a small server cluster. The case is actually a "mini-1U" design, which means it's the same width and height as a 1U-server case, but a few inches shorter than a full 1U, in order to accommodate office desks. Cooling aficionados take note: Two tiny case fans draw air through the CPU's heatsink, eliminating the need for active cooling on the chip. Very nice touch.

Our Sleekline 1260 came with a 40GB IBM 60GXP hard drive, 256MB of PC133 RAM, and a CD-ROM drive. A combo DVD/CD-RW drive is available as well.

During game benchmarking, the 1260 performed poorly, as expected. Our punishing *Quake III* test burns most systems to the ground. The Sleekline 1260? It couldn't even run the test at our standard settings. And because our *3DMark2001* DirectX 8 test requires a GeForce3- or Radeon 8500-caliber videocard, the 1260 failed to secure a ticket to *that* party.

PC Power & Cooling sells the Sleekline both as a complete, pre-fab system, and in kit form, where you get just the cool case and power supply, then add your own motherboard, CPU, and so on. Other accessories include a nifty carrying case you can tuck the entire machine into, and brackets for mounting the PC under a desk. The 1260 isn't for everyone, but it's certainly an impressive piece of engineering, and probably quite dandy for its target audience.

—GORDON MAH UNG

MAXIMUMPC VERDICT

SLEEKLINE 1260
PC POWER & COOLING

+ WHAT WE LIKE
It's svelte, tough, and intelligently engineered.

– WHAT WE HATE
No audio, no DVD, no CD-RW, no 3D video—can we even call this box a real PC?

760.931.5700 www.sleekline.com
$1,900 w/flat panel monitor

7

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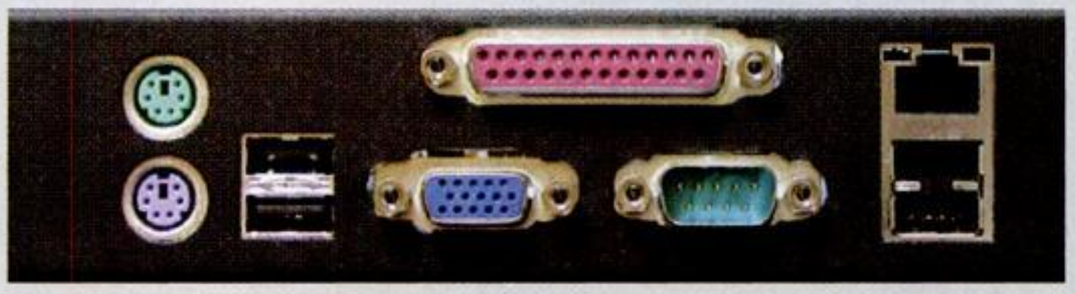
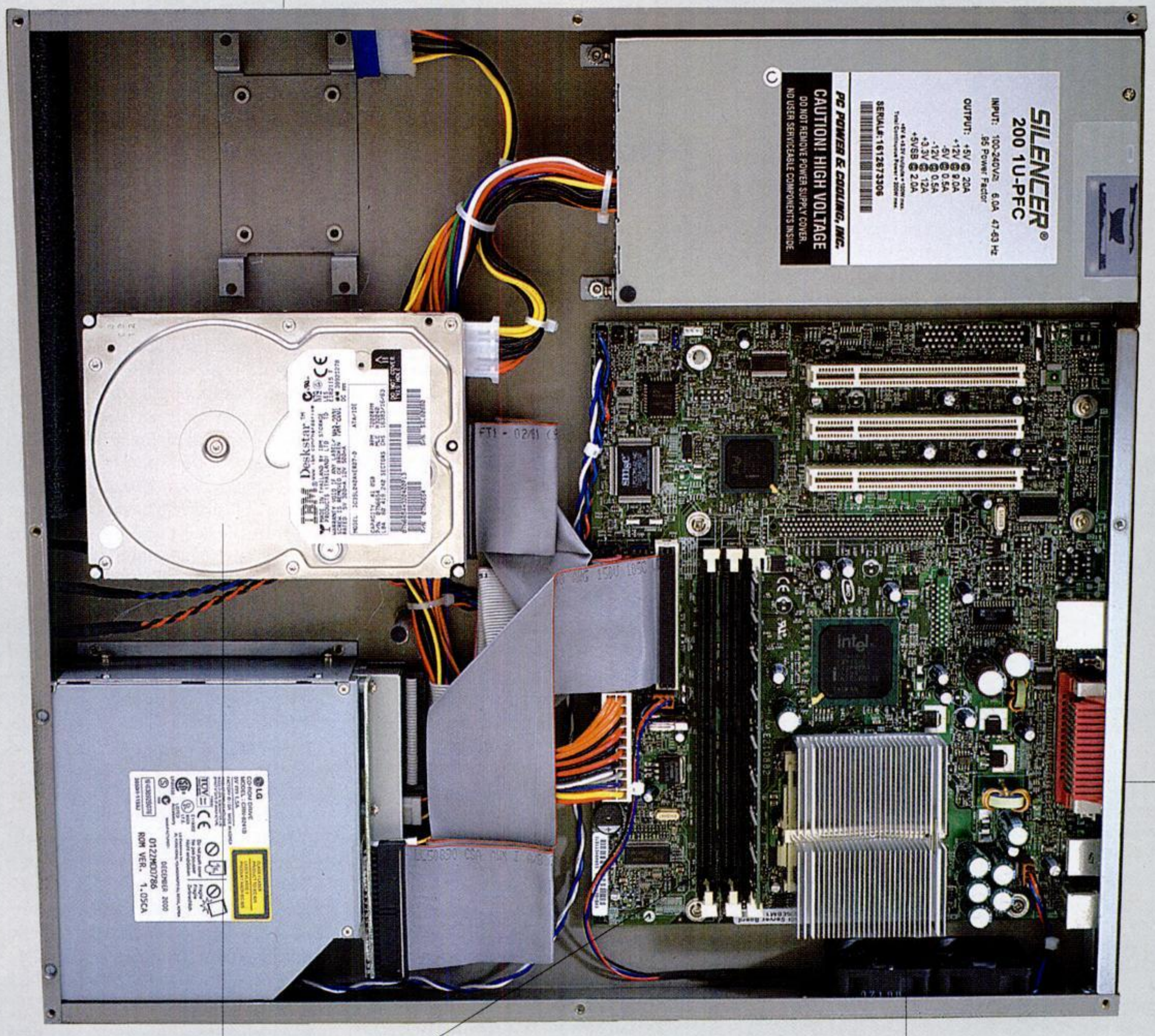
Case closed: Comes with a handy dandy carrying case for the PC.

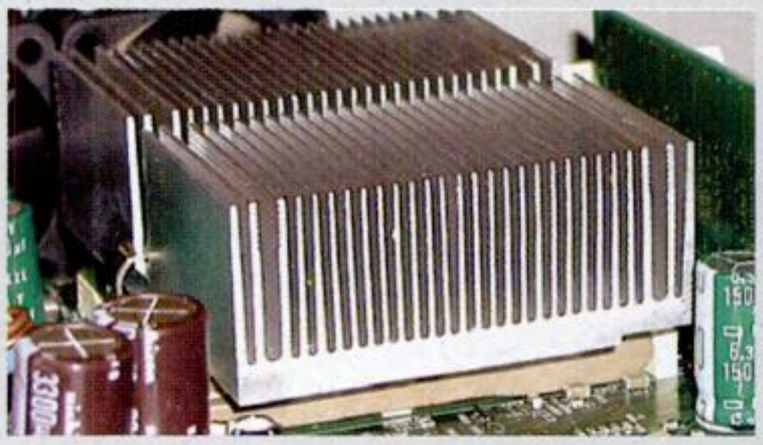


Let's porty: Intel's S815EBM1 features four USB ports using two separate USB controllers.



Da Deskstar: While most business boxes or mini-servers pack 5400rpm hard drives, the Sleekline 1260 features the beloved and fast 60GXP and room for a second hard drive as well.

Mini memory: The Achilles' heal of the S815EBM1 is its maximum memory capacity: Just 512MB.



Fan-tastic: We've speculated that an active heatsink is unnecessary to cool a Tualatin P-III, and it's true. The Sleekline 1260 relies on a pair of fans and passive cooling to keep the 1.26GHz CPU cool.

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Polywell Poly 880XP-1900

Great speed, great price, but some things ain't so nice

A whole lotta speed at a price that won't make you bleed.

At the heart of the Polywell 880XP is AMD's 1.6GHz Athlon 1900+. This CPU is coupled with a GeForce3 Ti 500 videocard, so it came as no surprise that the 880XP matched most of the benchmark-demolishing speeds of the Falcon Northwest Mach V that received a Perfect 10 verdict last month. What did surprise us, however, was that Polywell managed to achieve its performance for nearly $650 less—and threw in 200GB of storage, the Sound Blaster Audigy Platinum, and a 22-inch monitor to boot! There's no getting around the fact that we've never seen so much speed for so little dinero.

UNDER THE HOOD

THE BRAINS	
CPU	AMD Athlon XP 1900+ (1.6GHz)
Motherboard	Gigabyte GA-7DXR (AMD 760 chipset)
RAM	Two 256MB PC2100 DDR DIMMs
I/O ports	One parallel, two serial, seven USB 1.1, (five front mounted), two IEEE-1394 (one front mounted), PS/2 keyboard and mouse, TV out, DVI, S/PDIF in/out, headphone jack, mic in x 3, line in x 3, MIDI in/out, optical in/out, digital out, line out x 2, rear out, two game ports
Open slots	One PCI, one DIMM
DISPLAY	
Videocard	Leadtek WinFast GeForce3 Ti 500 64MB DDR
Display	Viewsonic P225F 22-inch
Refresh@max res	79Hz@2048x1563
STORAGE	
Hard drives	Two 100GB Western Digital WD1000BBs (7200rpm, 2MB cache) striped in a RAID 0 configuration with onboard Promise RAID controller
DVD-ROM	16x Toshiba SD-M1502
CD-RW	BTC OEM 16/10/40
NETWORKING	
LAN	Generic 10/100Mbit Fast Ethernet
SOUND	
Soundcard	Creative Labs Audigy Platinum
Speakers	Creative Inspire 5.1 5300 Home Theater Speakers
MOUSE	
	Generic optical mouse
KEYBOARD	
	Logitech PS/2 Internet Keyboard
BUNDLE	
Windows XP Home Edition, Ulead *VideoStudio Basic SE, WinFastDVD, NTI CD-Maker 2000 Plus, DriveBackup!, Cubasis VST CE* (w/Audigy), *Wavelab Lite* (w/Audigy), *ReCycle Lite* (w/Audigy), *Deus Ex GOTY Edition* (w/Audigy)	
BOOT: 1:27 sec.	**DOWN: 26 sec.**

When we tested a 1.4GHz Athlon rig from Polywell in June, we were surprised that a 66MHz bin jump delivered a big speed boost in many of our benchmarks; the results weren't as dramatic this time. Nevertheless, the latest Poly's *SYSmark2001* score of 189 is the second highest we've ever recorded in an OEM rig, just behind the Mach V by one point. The 880XP also broke the OEM records on our *Premiere* script and *MusicMatch* MP3 encoding test by three seconds each. In our *Quake III* benchmark, the Poly pumped out 80.3fps—again, neck and neck with the Mach V. The only benchmark the Poly 880XP got whipped in was *3DMark2001* Game 4. The Poly's "vanilla" GeForce3 Ti 500 delivered 26.6fps, which couldn't compete with the Mach V's overclocked Ti 500 result of 31.2fps.

The comparison with Falcon's Mach V pretty much ends at the benchmarks—there's a lot more to the 880XP than sheer speed. Polywell threw in two 100GB Western Digital 1000BB drives (the 2MB cache versions) in an ATA/100 RAID 0 configuration courtesy of an onboard Promise controller. If you need more storage than that, we'd like to know what you're up to. The rig's Gigabyte 7DXR mobo features a dual BIOS feature that can be a lifesaver: If your BIOS surgery goes awry, the mobo will load the backup BIOS instead. The 880XP also sports the big daddy of Creative Labs' Audigy series, the Audigy Platinum, with its front-panel FireWire and stunning array of audio connection options.

But where they skimped on the 880XP really shows. While the Toshiba 16x DVD was a fine choice, we don't know what they were thinking with the no-name 16/10/40 CD-RW drive. Scoring 4:32 in our *Audiograbber* ripping test isn't exactly embarrassing, but in a system of this caliber we expect a 24x, or at the very least a 16x from a top-of-the-line manufacturer like Plextor. The generic mouse is a poor knock-off of the Microsoft Intellimouse Optical, and the Creative Inspire 5.1 speakers simply didn't.

With the money you save buying the Poly, you may want to invest in a sander: Polywell went completely berserk with the paint job. Not only is the case covered in an icky, texturized, silver coating, but the optical drives have been painted over, and—much worse—so has the Audigy front panel (wiping out the jack labeling). We also frown on the rubber molding that covers *most* of the edges of the plating over the drive bays and power supply; it doesn't extend far enough and actually exposes a dangerous half-inch of angry aluminum that could take off a chunk of skin during upgrading. In fact, all we liked about the case were the five front-side USB ports, which complement the two standard USB ports in the back.

Although some of the rig's pitfalls were a little too severe for our tastes, the 880XP is still an incredible bargain for serious gamers, offering mostly top-of-the-line components, as well as teeth-rattling speed at an unprecedented price.

—LOGAN DECKER

MAXIMUMPC VERDICT

Poly 880XP-1900
POLYWELL

+ WHAT WE LIKE

Polywell stuffed the case with the very best components a gamer could wish for.

– WHAT WE HATE

It's the case they stuffed them into that bugs us. And what's with the cheap CD-RW drive and mouse?

800.999.1278 www.polywell.com
$3,200 w/22-inch monitor

9

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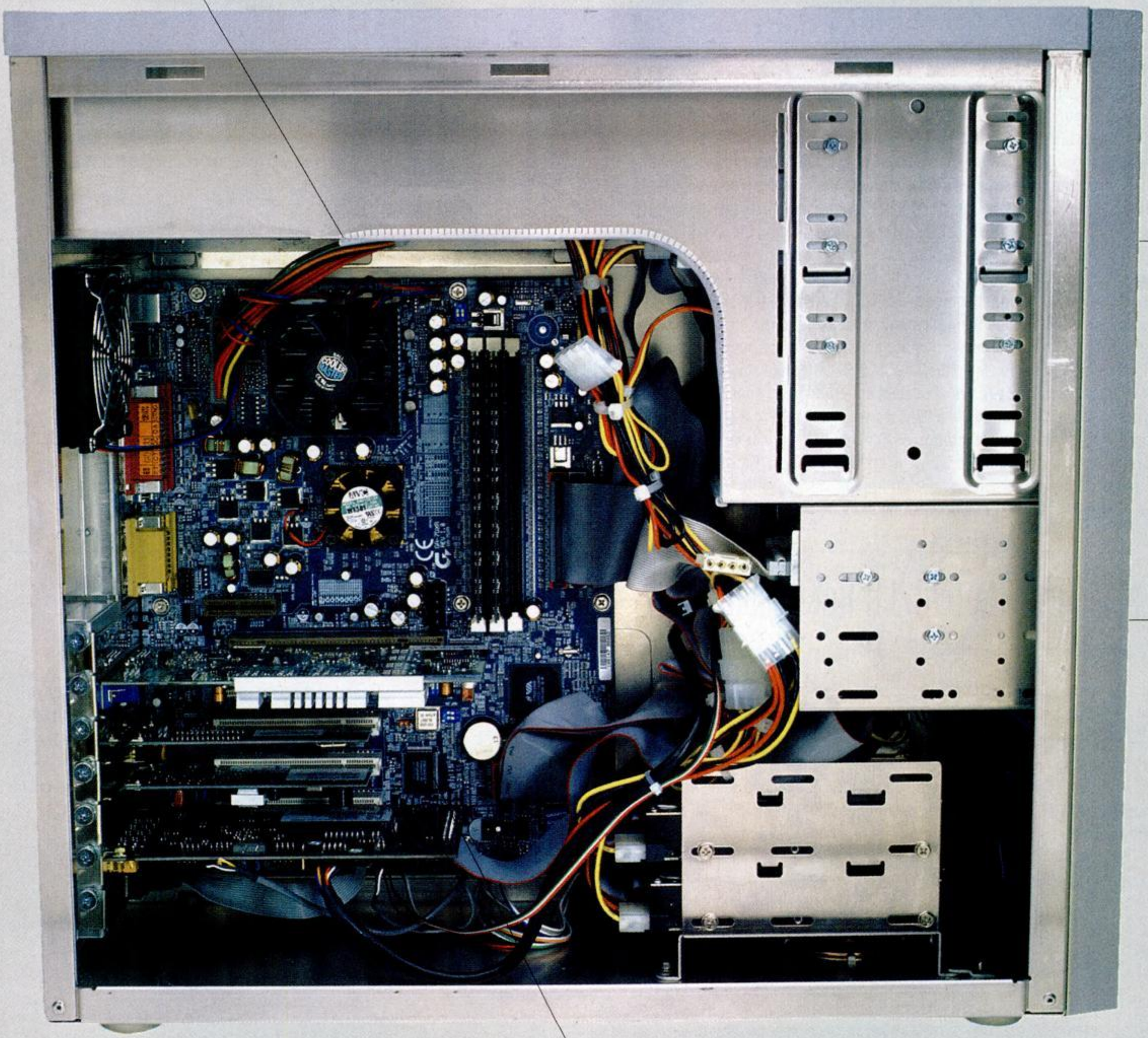
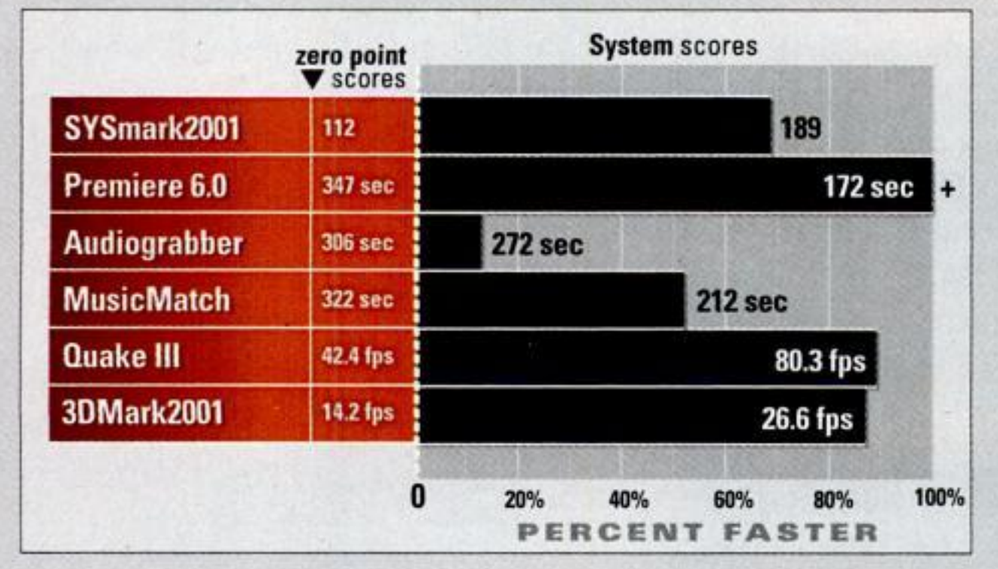
This case bites!: The interior edges of the case aren't rounded or smoothed out, and the rubber molding doesn't quite cover everything.

Form over function: Polywell sprang for the best soundcard in the Audigy family, then painted over all the jack labels. D'oh!



Made to RAID: Promise's onboard RAID controller frees up a PCI slot, which is nice considering there's only one available.

Ports-a-plenty: No less than five USB ports greet your peripherals at the door. Unfortunately, they're all USB 1.1.



Full benchmarking details in the Mag Reprints section of MaximumPC.com

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Maxtor 3000LE 40GB External Hard Drive

No FireWire? No problem—USB 2.0 is here

The case is handsome and rugged, but has only a few rubber gaskets as shock protection. Don't play hot potato with the 3000LE.

We've taken a fairly hard line against external mass storage devices that use the USB 1.1 interface. In fact, our words have been tantamount to a resounding "blech!" A throughput ceiling of 1.5MB/sec just doesn't cut it for drive capacities of 5GB and more.

But the USB 2.0 spec—with a ceiling of 60MB/sec—promises to transform our "blechs!" into righteous "hoo-yahs!" The Maxtor 3000LE is the first USB 2.0 external hard drive we've tested, and while its real-world transfer rates didn't exactly blow us away, the 40GB drive does fulfill its basic promise: high-speed external storage, backward-compatibility with USB 1.1, and none of the heartbreak of FireWire, which just isn't supported by enough PCs to be practical for external-drive sharing among numerous rigs.

The 3000LE is roughly the size of a hardback book and is enclosed in a rugged, translucent plastic case with two LEDs that indicate whether the drive is on and active. Inside the case is a 5400rpm drive from Maxtor's D540X series. It's difficult to benchmark many of today's external drives because the different interfaces flummox our standard suite of tests, but we were able to clock the random access time of the 3000LE at 19.7ms using an early version of *HDTach* (version 2.52). We also clocked a read burst speed that hovered around 16.5MB/sec, which is a far cry from the theoretical ceiling of USB 2.0's throughput. As a portable storage device, however, the drive's real-world performance sent a more inspiring message: We copied 37GB in just 53 minutes.

If you're looking for a faster performer, Maxtor does offer the 60GB FireWire 3000DV with a much speedier 7200rpm drive for $300. It's too bad Maxtor didn't include this drive in the 3000LE, because it would have likely won a Kick Ass Award. Still, we're happy to finally have an external hard drive that offers high-speed data transfers but isn't completely useless if you take it to someone who's stuck with USB 1.1.

WHAT WE LIKE: USB 2.0 external storage at last! And it doesn't disappoint us.
WHAT WE HATE: A 7200rpm drive speed would have been a far better fit in Maxtor's first USB 2.0 external drive, and you still need to get a USB 2.0 card to get the most out of this card.

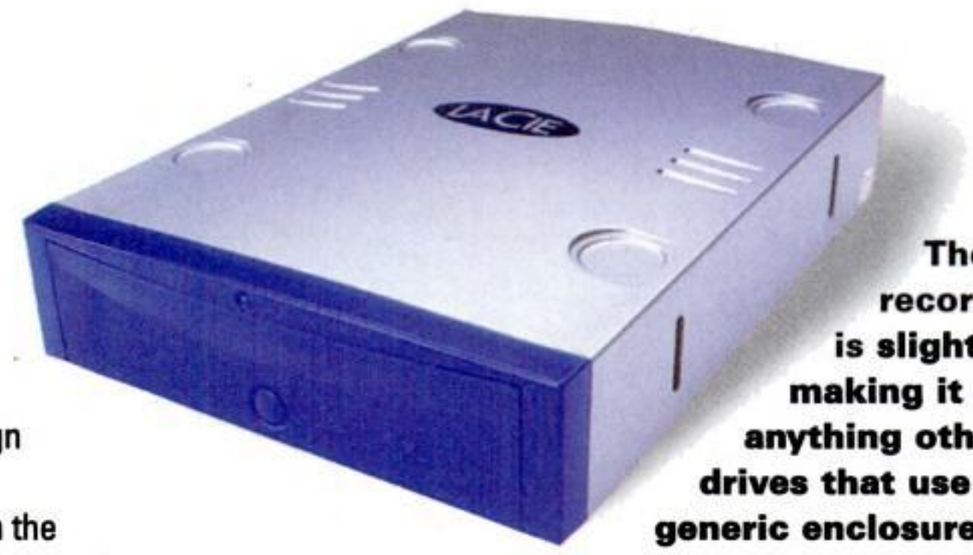
—LOGAN DECKER

MAXIMUM PC VERDICT: 8

$200, Maxtor, www.maxtor.com, 800.262.9867

LaCie FireWire DVD/CD Rewritable

A sorry cage can't break this drive's spirit



The top of LaCie's recordable DVD drive is slightly convex, making it difficult to stack anything other than LaCie drives that use the same generic enclosure.

We gave Pioneer's DVR-A03—the first DVD/CD burner priced under $1,000—a Kick Ass Award in the July 2001 issue. This month, the exact same drive technology is back for an encore, though now in external trim, with a FireWire interface, and bearing the LaCie banner. Unfortunately, LaCie packed the drive in a stupid case, which is particularly galling considering the luscious design and ruggedness of LaCie's own Pocket series of peripherals.

The new drive's cheap, spring-loaded faceplate blocks everything on the front of the drive—the headphone jack, volume control, disc activity LEDs, and worst of all, the eject button. It's extremely difficult to reach the eject button when the CD tray is out, so you're forced to push on the tray itself. A common practice for many, perhaps, but a big no-no here in the Lab, where we prefer to take better care of expensive peripherals.

The drive is bundled with the standard, suite associated with the A03, including Sonic Solutions *MyDVD 2.3* for DVD authoring and *PrimoDVD* for disc mastering. In our tests, writing 4.25GB to a disc using *PrimoDVD* took one hour and two minutes. This compares very poorly to the scorching 28 minutes achieved with Ahead's *Nero,* which has supported the –RW format since version 5.5.4.0.

But even an underwhelming software bundle can't negate the fact that the LaCie external packs a Pioneer DVR-A03 drive, a fantastic and versatile performer that would be attractive even if covered in sauerkraut. And now that Pioneer has dropped the price of the A03 to $650, the LaCie version is expected to fall to $700 by the time you read this, which is good news for everyone who wants a piece of the recordable DVD action.

WHAT WE LIKE: The only thing better than being able to write to 4.7GB DVD media is being able to take the whole drive with you.
WHAT WE HATE: We think we've made our feelings about the case patently clear. And dedicated backup software would have been a welcome addition.

—LOGAN DECKER

MAXIMUM PC VERDICT: 7

$890, LaCie, www.lacie.com, 503.844.4500

BENCHMARKS	DVD	CD
Average data transfer	4.42MB/sec	1.83MB/sec
Random/full-stroke seek (ms)	151/332	140/297
Audio extraction (min:secs)	-	10:33
Data CD burn (min:secs)	-	10:03
Data DVD burn (min:secs)	60:02*	-
CPU utilization (2x)	50%	6%

Note: The audio extraction test uses a commercially stamped 75:27 minute audio CD. The data CD burn test uses the bundled applications to create a 647MB CD-R. The data DVD test uses the bundled applications to create a 4.25GB DVD. Effective December 2001, random and full-stroke access times are measured across the full span of a 700MB disc. This will result in lower access times than reported in previous reviews of similar drives. For more information on how we benchmark optical drives, look at the Mag Reprints section of MaximumPC.com.
*The drive also hit 28:09 using *Nero Burning ROM 5.5.4.0.*

THE BUNDLE

Prassi *PrimoDVD 2.0,* Sonic *MyDVD 2.3,* Cyberlink *PowerDVD 3.0*

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Xtacy Everything 5564

It's about damn time we saw a shipping Personal Cinema board!

When we first saw a Personal Cinema reference board from nVidia—way back in May 2001 during the E3 trade show—we were absolutely blown away. It was as if the nVidia engineers had gone down our wish list of features for a TV tuner/entry-level videocapture device, then created the ideal product. With timeshifting features that let you pause, rewind, and show instant replays of live TV, as well as the ability to record programs to your hard drive for later playback, the Personal Cinema does almost everything our TiVo and ReplayTV boxes do.

In fact, as far as we can tell, the Personal Cinema has had only one significant problem—it's been vapor for nearly half a year! Sure, we were able to snag a reference unit for our September issue Dream Machine article, but no nVidia partners have been able to send us a shipping, reviewable product. Until now. Visiontek has finally delivered the first Personal Cinema card—the Xtacy Everything 5564.

The secret of the Xtacy Everything is the Personal Cinema chip, which can be attached to a daughtercard or soldered onto the board, as with this card. The proprietary connector on the Personal Cinema daughtercard connects to a bright green box, which serves as a media hub and holds the system's TV tuner. Unfortunately, the Personal Cinema won't be available as an upgrade kit for existing GeForce owners, so you'll have to buy the whole videocard/breakout device bundle if you want the features offered by this handy-dandy device.

Features, you say? Actually, the Xtacy Everything does indeed bring a veritable cornucopia of new features to the standard GeForce2 MX board that Visiontek has paired it with. TV viewing, TV timeshifting, TV recording, DVD playback, and TV guide software are just a few of the Xtacy Everything's wonders. Intervideo's bundled *WinPVR* allows you to thoroughly customize your recording settings. This entails everything from adjusting buffer size (the amount of hard disk space reserved for timeshifting) to recording quality settings, which range from low-res, low-quality, compressed streams to massive, uncompressed streams that will fill a 120GB hard disk in 20 minutes.

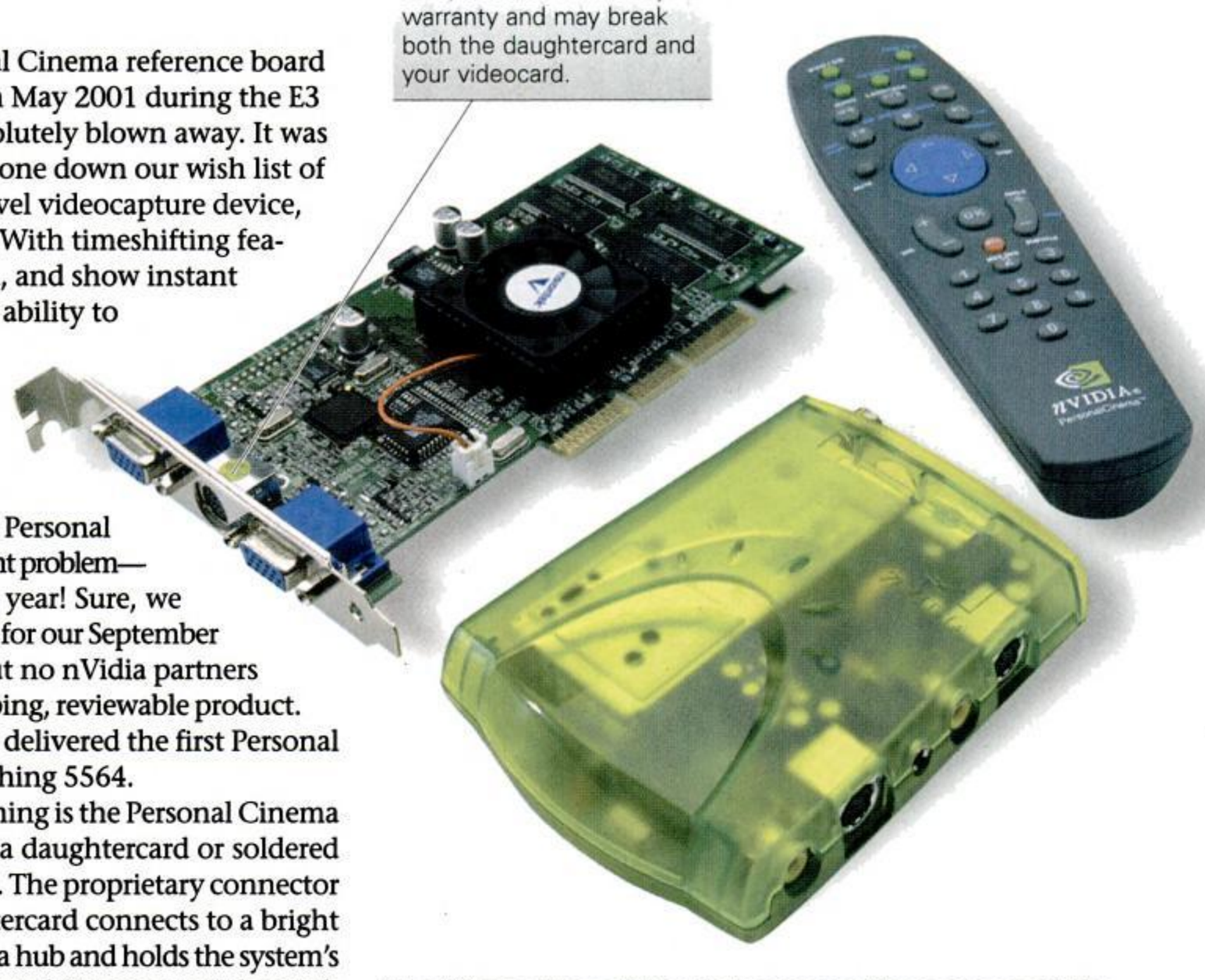
The Xtacy Everything's remote is a good size and includes enough buttons to let you control most anything you'd need. It's especially easy to switch from DVD to PVR mode. All you need to do is press either the DVD button or the PVR button, and the appropriate application will launch on your PC while the other one closes.

We were a bit disappointed to find that the Personal Cinema lacks HDTV support, and that the TV guide software doesn't allow easy recording of scheduled programs. We also think it would be cool if the remote worked with our favorite MP3 jukeboxes. And like all other PC-based PVR devices we've tested to date, the Personal Cinema lacks IR repeaters, which would allow your PC to change channels on your cable box or satellite dish. This is potentially a big problem: If you're using a cable box or satellite dish, you'll have to manually change channels for all the various shows you want to record. Luckily, you won't have this problem if you use just basic cable.

Our biggest gripe with the Xtacy Everything is that it's based on an underpowered 3D accelerator that's nearing obsolescence. In order to live up to its name, the Xtacy Everything should pair its PVR functionality with a top-of-the-line 3D accelerator complete with programmable shader support.

The upshot? If you're looking for a PVR board and don't really care about 3D acceleration, the Xtacy Everything 5564 is your card. But if you want a more powerful all-around videocard, you'd be well advised to wait a month or so until GeForce3-based Personal Cinema cards are available.

—WILL SMITH



The Personal Cinema daughtercard snuggles into a proprietary port on most GeForce2 and GeForce3 cards, or can be soldered directly onto the board. If your card has the port, you might be able to "upgrade" your GeForce with the Personal Cinema daughtercard, but that will void your warranty and may break both the daughtercard and your videocard.

The Xtacy Everything lets you perform many of the functions of a much more expensive stand-alone PVR on your PC.

BENCHMARKS

Quake3 MPC demo	30fps
3DMark2001 Game 2	12.2fps
3DMark2001 Game 4	DNRfps

All tests were run using the 21.83 reference drivers for this board on our Hewlett-Packard P4 1.3GHz test bed. Tests are run at 1280x1024 in 32-bit color with FSAA and vsync disabled in the driver.

MAXIMUMPC VERDICT

Xtacy Everything 5564
VISIONTEK

WHAT WE LIKE

Great image quality, an easy-to-use remote control, and configurable options make the Xtacy Everything a good choice for someone looking for a PVR.

WHAT WE HATE

The Xtacy Everything's aging GeForce2 MX chipset is underpowered for today's games. We'd like to see a GeForce3 version.

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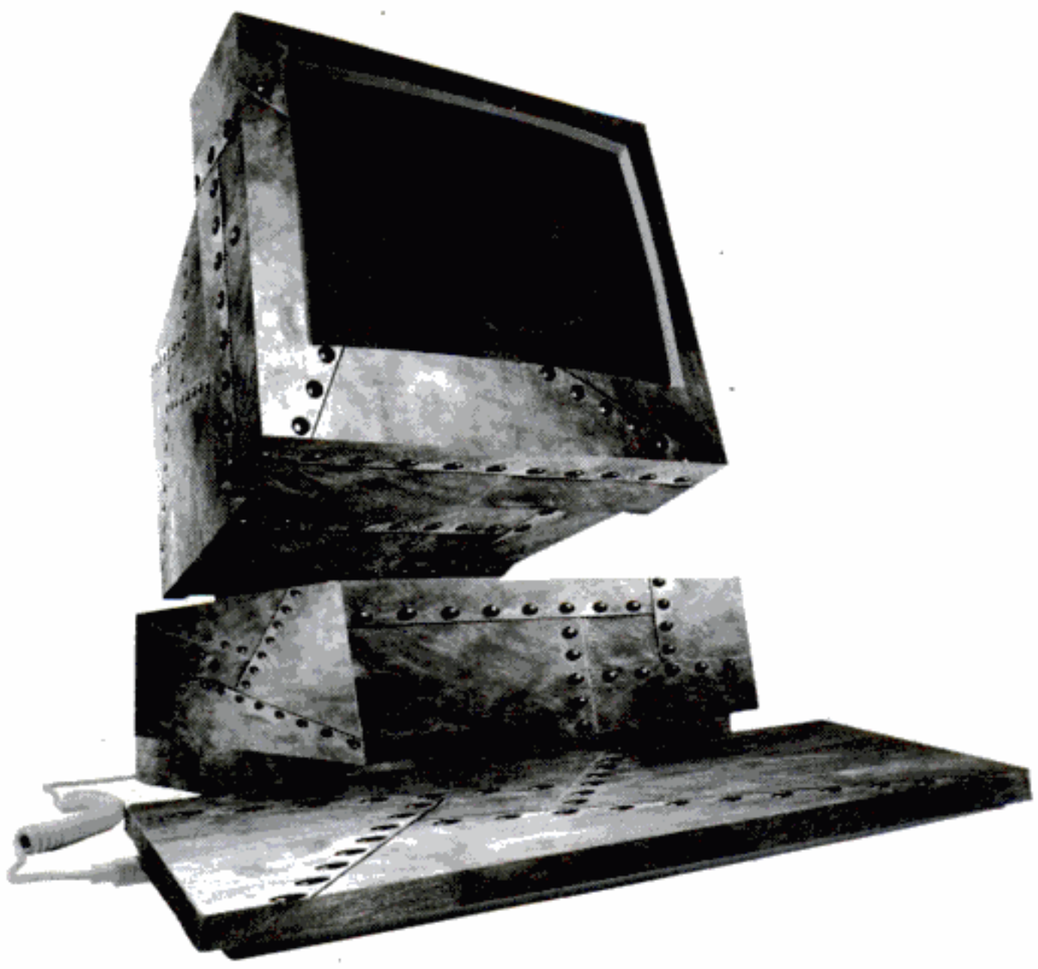

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AVerMedia AVerTV Box

No one is this desperate to watch "Friends"

It's tough to recommend the AVerTV Box to even the most desperate studio dweller who wants to watch TV on his or her PC monitor. While it has some great angles—it requires no drivers and even works with your PC turned off—we found only headaches and limitations, and few of the fancy features offered by internal tuner cards.

The AVerTV box manages to do its unimpressive work by taking the VGA output from your videocard, overlaying a television signal, then sending it out to your monitor's VGA input. The AVerTV, to its credit, will accept S-video, composite, and analog composite inputs as well, but aside from VGA, it outputs only to composite video.

We were disappointed to find that the "picture-in-picture" feature (for using your PC and watching TV simultaneously), supports desktop resolutions up to just 800x600. Otherwise, it's full-screen TV or nothing. When we reduced our resolution, the resulting television image was marred with artifacts and strange scan lines we couldn't get rid of. Even if it worked flawlessly, we wouldn't bother using this feature, because the overlayed image is unmovable and sits in the top-left corner of the screen—it's not possible to bring a *Word* document to the foreground, for example. Worst of all, passing your VGA signal through the AVerTV Box at any resolution greater than 800x600—even with the unit turned off—seriously degrades the image, resulting in a gray and blurry desktop. And what's so great about having the PC turned off when the AVerTV box makes its own whining noise?

For far less money than the suppository-shaped AVerTV, you can get an internal card from Hauppage or ATI with PVR features, screen capture, and even program guides.

WHAT WE LIKE: The AVerTV Box doesn't require drivers, and you won't have to leave your PC turned on to watch TV.

WHAT WE HATE: The image quality sucks, and unless you want to disconnect the unit when you aren't using it, you're going to hate what it does to your PC display.

—LOGAN DECKER

MAXIMUM PC VERDICT: 3

$160, AVerMedia, www.avermedia.com, 408.263.3828

The shape of the AVerTV Box reminded us of a suppository (on second thought, so did using it).

Hercules 3D Prophet III Ti 200

From the same people who brought you New Coke?

Some people are first in line at CompUSA when a new 3D accelerator family is released, while others take a wait-and-see approach with each new videocard. If you fall into the first category, then pass on the GeForce3 Ti 200–based Prophet III Ti 200, because you already own an original GeForce3, which is superior technology. But if you're still running a GeForce2 or some type of 3dfx board and you're looking to get a card that will power today's newfangled programmable shader games without paying for a top-of-the line GeForce3 Ti 500 board, the Prophet III Ti 200 might be just the ticket.

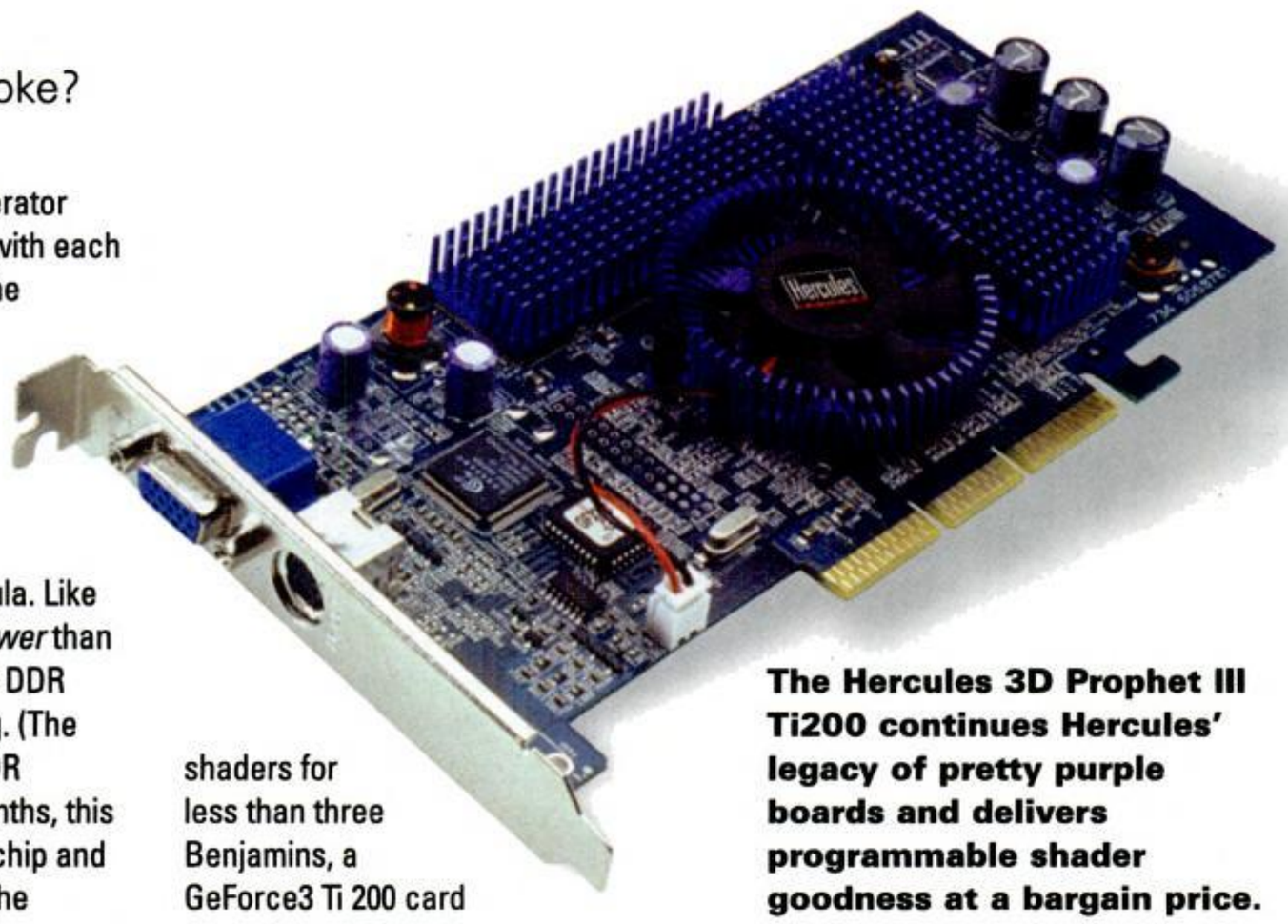
Like New Coke, the Prophet III Ti 200 is inferior to the original formula. Like all other Ti 200 boards, the Hercules Prophet III is clocked slightly *slower* than the original GeForce3. With a core speed of 175MHz and just 200MHz DDR SDRAM (spec'd at 4.0ns), the Prophet III lagged during benchmarking. (The original GeForce3 ships with a 200MHz core, but includes 230MHz DDR SDRAM). Like most nVidia-based cards we've seen in the past 18 months, this card is virtually identical to other cards based on the same graphics chip and memory. Other Ti 200–based cards include the Visiontek Xtacy 6564, the Leadtek WinFast Titanium 200 TDH, and the Elsa Gladiac 516.

We do like the card's purple color scheme, and we wonder if limited edition gold or black boards are on the horizon for Hercules. Aside from cosmetics, the Prophet includes S-video outs, but eschews DVI.

BENCHMARKS	
Quake3 MPC demo	66.9fps
3DMark 2001 Game 2	39.2fps
3DMark 2001 Game 4	19.9fps

Tests are run at 1280x1024 in 32-bit color with FSAA and vsync disabled in the driver.

The only saving grace for the Prophet III Ti 200 is its price. If you're looking for a 3D accelerator that has programmable shaders for less than three Benjamins, a GeForce3 Ti 200 card suits the bill perfectly. However, if you can find an original GeForce3 at the same price—and they're moving fast—grab it instead.



The Hercules 3D Prophet III Ti200 continues Hercules' legacy of pretty purple boards and delivers programmable shader goodness at a bargain price.

WHAT WE LIKE: We love programmable shaders in all their forms, and Ti 200 is the least you'll pay for that kinda lovin'.

WHAT WE HATE: The Ti 200 is the New Coke of the videocard world. It's new and leaves a slightly disappointing taste in our mouths.

—WILL SMITH

MAXIMUM PC VERDICT: 7

$230, Hercules, www.hercules.com, 877.484.5536

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The Decker Report

Our features editor Logan says, "connect everything, read everything, and type from the couch"

Pocket DigiDrive Flash Memory Reader

Your camera takes CompactFlash, your MP3 player uses SmartMedia, your PDA requires MMC, and everything you've got from Sony insists on Memory Stick. You could hook up every one of these devices directly to the PC whenever you want to transfer files, but that would make you a simpleton. No, the truly dedicated technophile has the Addonics USB Pocket DigiDrive to read the seven major types of flash memory: CompactFlash Type I and II, SmartMedia, Memory Stick, MultiMediaCard (and its uptight sibling Secure Digital), and even IBM's Microdrive (with an optional power adapter). After driver installation, each media format is recognized as a USB 1.1 Mass Storage class device and assigned its own drive letter and unique icon in My Computer. There's no question that this widget alleviates some of the pain and nausea caused by juggling so many different formats.

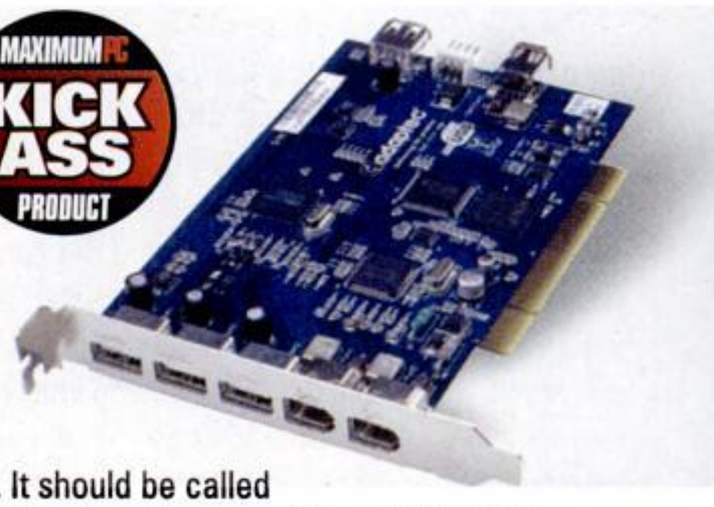
WHAT WE LIKE: Seven different docks and readers hooked up to your PC, or just one? You make the call.

WHAT WE HATE: There aren't any visual cues on the drive indicating the proper orientation of the media.

MAXIMUM PC VERDICT: 9

$90, www.addonics.com, 510.438.6530

DuoConnect Combo FireWire and USB 2.0 Card



FireWire or USB 2.0? The DuoConnect drops into a PCI slot and gives you support for both specs. It includes three FireWire ports (one internal) and four USB 2.0 ports (one internal) and uses a four-pin mobo connector to supply the juice to your bus-powered devices. It should be called the TrioConnect, because USB 2.0 is backwards-compatible with USB 1.1 devices. Adaptec went the extra step by bundling *VideoWave 4* for video editing and *MyDVD 3.0* for DVD authoring. (This latest version of *MyDVD* is a vast improvement over the 2.3 version.) The DuoConnect survived heavy traffic from simultaneously connected CD burners and hard drives with all ports full, so our only complaint is the lack of a 3.5-inch drive bay bracket adapter for bringing a few of those ports to the front of the case, where they belong.

WHAT WE LIKE: The DuoConnect gives you the best of both worlds and augments the ports you already have.

WHAT WE HATE: We could have done without the DV editing software—redundant for many DV cam owners—in favor of a lower price.

MAXIMUM PC VERDICT: 9

$130, www.adaptec.com, 800.442.7274

Logitech Cordless Freedom Optical

Logitech's stable of free-range peripherals just got a boost with the Cordless Freedom Optical wireless mouse and keyboard—but gamers will likely remain unamused. The keyboard offers the traditional complement of programmable hotkeys and throws in some swank new appointments such as a scroll wheel and Go button for quick URL entry. The range of both peripherals is around six feet and doesn't require line-of-sight proximity. Whenever we found that the keyboard tracked too slowly or dropped characters (particularly when the transmitter was blocked by metal or radiation suits), we simply had to move the transmitter just a few inches to establish a solid connection. But the mouse's refresh frequency (which has been reduced to conserve battery life) still doesn't cut it for gamers, and its 800dpi resolution pales in comparison to the dual 800dpi sensors of Logitech's Dual Optical. Considering that the Cordless Freedom Optical was clearly designed for applications rather than gaming, we think it should have been imbued with iFeel effects as well.

WHAT WE LIKE: Having to deal with fewer cables speaks for itself.

WHAT WE HATE: It requires six AA batteries and packs no less than four craplets into your system tray. Enough already!

MAXIMUM PC VERDICT: 7

$100, www.logitech.com

FireConnect for Notebooks

Notebook manufacturers do the darndest things. They give you a 1GHz processor, 256MB of RAM, and plenty of hard drive space—but no FireWire port for the video-editing projects that would actually make use of all these system resources! So the clever port people at Adaptec (no photographs, please) bring you the FireConnect for Notebooks, a three-port FireWire CardBus adapter that supports data speeds up to 400Mbps and opens up your laptop to high-speed external peripherals, such as digital video cameras. Adaptec also bundles its standard suite of MGI *VideoWave 4* for video-editing and Sonic *MyDVD 3.0* for DVD authoring. There's a nasty catch, however. If you attach any bus-powered devices, you'll need to attach a power adapter to the jack installed on the card. Curiously, the adapter is not included, nor is one even sold by Adaptec at press time! You can easily get a compatible adapter at Radio Shack, but come on guys, give us a break.

WHAT WE LIKE: The FireConnect instantly lets your notebook take advantage of scads of high-speed FireWire peripherals.

WHAT WE HATE: You're out of luck using bus-powered peripherals unless you supply your own adapter.

MAXIMUM PC VERDICT: 7

$100, www.adaptec.com, 800.442.7274

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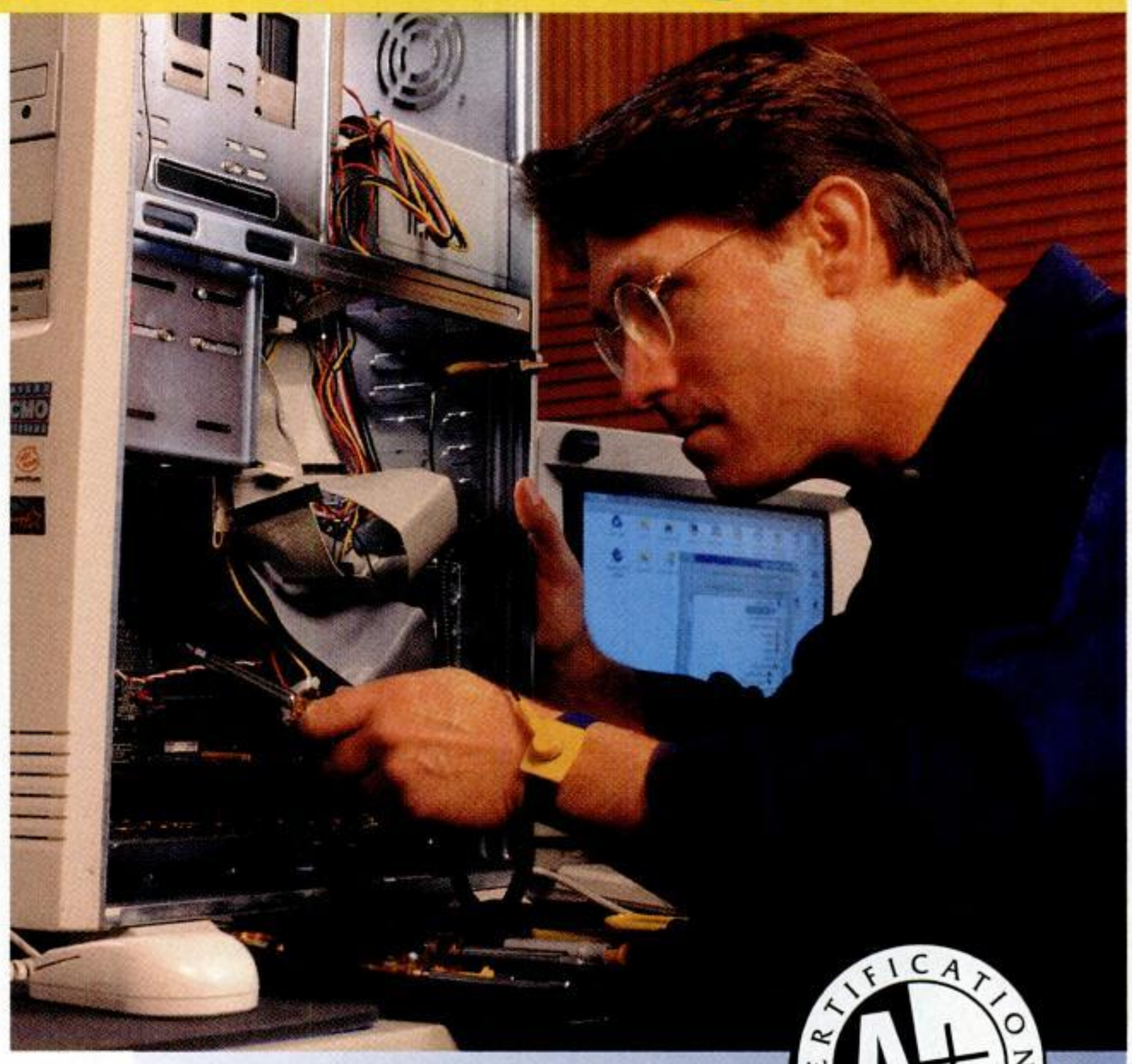

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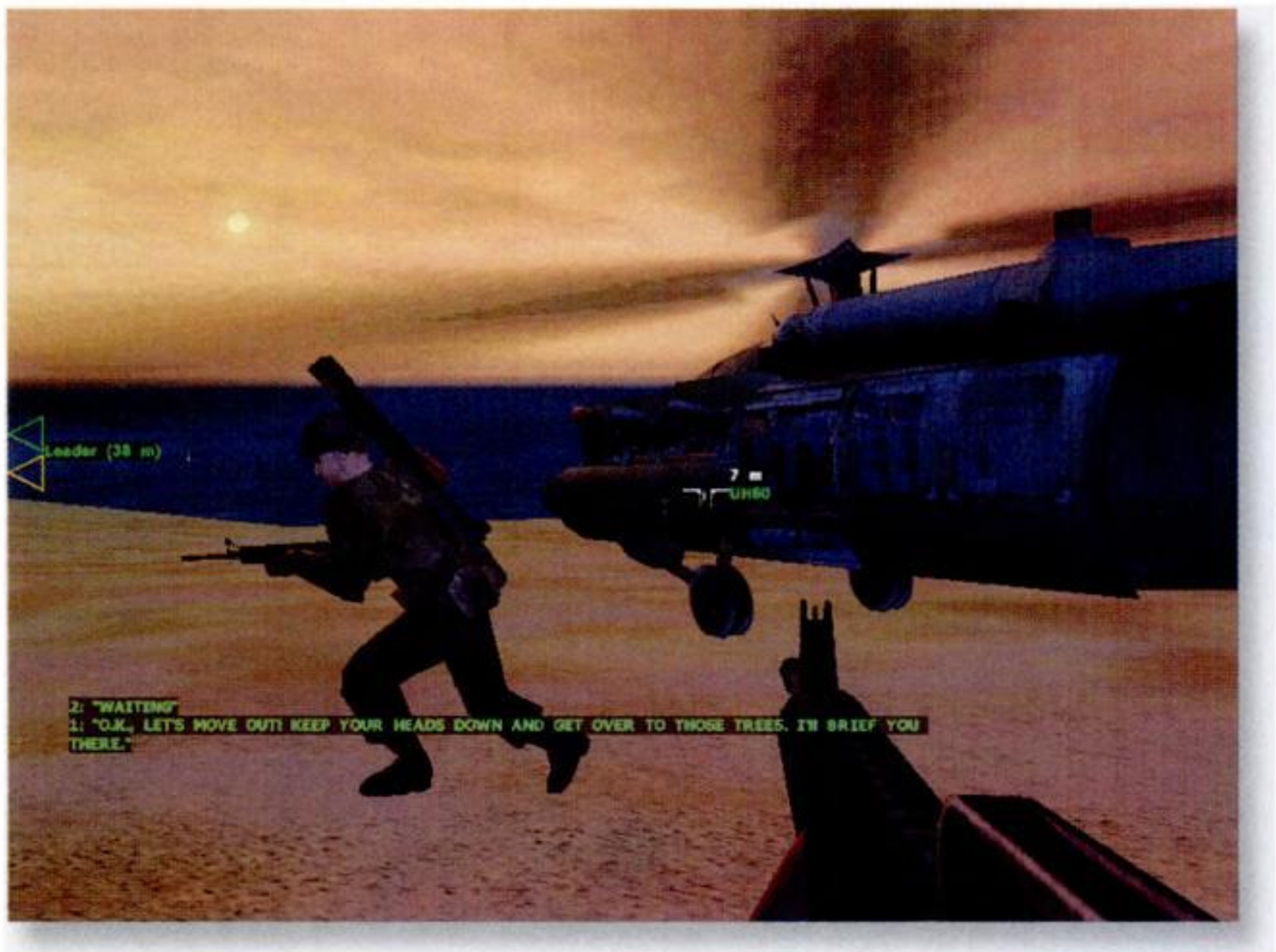
Operation Flashpoint

Or what happens when a shooter gets too realistic for its own good



***Operation Flashpoint* makes an admirable attempt at simulating real military procedures like this rapid deployment from a helicopter. But the choppy graphics and lame dialog are a letdown.**

One of our colleagues described *Operation Flashpoint* as "the flight sim of first-person shooters," which accurately sums up the game's overall feel. Obviously inspired by realism-based tactical shooters like *Rainbow Six* and *Spec Ops*, *Operation Flashpoint* is an ultra-realistic simulation of squad-based infantry operations. It's definitely more of a sim than a first-person shooter, and like any squad-based shooter sim, it has little tolerance for maverick play. If you deviate from military doctrine or try to be a hero, you'll get burned, so forget about kicking open doors and barging into a room full of enemy grunts, guns a-blazing. That just ain't gonna happen. Instead, you'll spend much of the game on your belly, crawling through the undergrowth with squadmates as you attempt to advance on a target undetected. Raise your head for too long or fail to check your corners, and you'll be quickly shot dead (or, if you're lucky, merely wounded and forced to wait for a field medic). As you can imagine, it can become a fairly depressing experience, and you'll need the discipline of a real-life special-ops commando just to keep playing after a few frustrating missions.

Don't blame yourself if you get frustrated and start capping your own team members to relieve the boredom—it happened to us, too.

Our disappointment was compounded by truly egregious graphics. The game's proprietary 3D engine is stuttery and slow, and its textures have a flimsy, cardboard appearance. It's sloppy, too: On one occasion, we watched one of our fellow soldiers walk right through a wall! Then we got really confused in the later missions that let you operate land vehicles and helicopters, but with nowhere near the level of sim realism that applies to the foot-based action. Were these vehicle-based levels meant to provide some light relief, or were the game designers simply unsure of what kind of experience they were trying to offer? Either way, it didn't sit well with us. Nor did the strange, quasi-realistic political scenario. The game is set in 1985 during the height of the Cold War, which is all good and interesting except that the action takes place in a purely fictional location called the Malden Islands. The setting alludes to something somewhat Balkan-esque, but why use a fictional war theater in the first place? If you're trying to deliver a realistic military game, at least let us fight in a place we recognize and can relate to.

Rainbow Six showed us that first-person shooters could be much more realistic, tactical, and involving than anybody had previously imagined. But a game like *Operation Flashpoint* makes you question just how far that direction should be pursued. At the very least, it demonstrates that the more realism a game aspires to, the more delicacy and expertise is required to pull it off. You could argue that *Flashpoint* does a great job of illustrating that real ground-combat engagements are neither *Rambo*-esque nor glamorous, but rather slow, time-consuming, and tedious, and punctuated by brief moments of panic, confusion, and banal violence. After several missions in *Flashpoint*, we found ourselves wishing we could transfer out, then reenlist for some *Rogue Spear* duty instead. Heck, even *Counter-Strike*. At least those boys see some action.

—GARY WHITTA

MAXIMUMPC VERDICT

Operation Flashpoint
BOHEMIA INTERACTIVE

+ WHAT WE LIKE

Admirable realism goals. Military buffs will appreciate the authentic weapons and tactics.

– WHAT WE HATE

The graphics suck and gameplay is slow and frustrating. Vehicle-based sections are out of place here.

www.codemasters.com
$30

5

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Pool of Radiance: Ruins of Myth Drannor

A return to the glory days of the PC RPG? Don't bet on it

In *Pool of Radiance: Return to Myth Drannor,* the problems creep up on you. Individual elements—particularly the turn-based combat—all look very slick, but then the irritations begin to mount. Because this is a sequel to SSI's series of Gold Box RPGs and the first game to use the *Dungeons & Dragons*: 3rd Edition rules, it was fair to expect an RPG experience akin to *Baldur's Gate,* but *Pool* delivers mostly monotony.

The problems begin with character creation, which has been stripped of custom skill and feat selection. These are the very elements that enable gamers to actually *role* play by creating a unique character, and their absence is sorely missed. The game doesn't emphasize character development or even narrative. Narrative exposition is pretty terse, NPC interaction is rather minimal, and quests are scattershot rather than tied to some overarching purpose.

The story begins with a short introductory level on the outside before your party of four is plunged into an endless dungeon with precious little narrative or character interaction and just a few creature types. Orc, zombie, orc, zombie: This goes on for *hours* with a Level 2 party and the occasional, ultra-powerful Wraith to make things really annoying. The dungeon itself takes more than 20 hours to clear. Thus, 20 minutes into the game, *Pool of Radiance* turns into a slower, larger *Diablo* with turn-based combat. Like *Icewind Dale* (but not as good), it features a lot of time underground.

Old-school, turn-based RPG-style combat makes a welcome comeback in *Pool of Radiance*.

Character interaction is infrequent and generally simple. This will be good news for those who don't like the endless text blocks of *Baldur's Gate*.

Once past the initial disappointment, some people may enjoy the game for what it is: a glorified dungeon crawl. And, really, there *are* things to like. The turn-based combat is a real treat, as your party whips up complex, multilayered attacks against multiple foes. The interface seems clever at first glance; all the actions are in nested pop-up menus. But the menu items and controls are too small to navigate with ease, which makes getting deep into your spell book pretty vexing. Nine activities can be mapped to function keys, but that still leaves plenty of activities unmapped. The fussy interface may have worked better if it was a little larger.

Combat encounters are somewhat weakened by the engine's most egregious failing: a limited ability to scroll. The view screen is too small, and you cannot scroll ahead. This makes crossing a map clumsy and frustrating, and can also cause some enemies to be off screen in combat encounters. Plus, you can't split up your party or even have a character walk away to scout ahead. No character can move more than a screen's length away from the entire party. This is a lot more annoying than it sounds.

To cap it all off, *Pool of Radiance* is loaded with bugs. Not just little bugs, but giant Guatemalan Spitting Beetle–size bugs, such as a de-installer that has forced many users to *reformat their hard drives* and save games that have been irreparably corrupted. Level advancement also seems a bit hinky, and you can install *only* to a default directory on a C drive.

These problems never completely override the game, probably because it looks swell and the combat system is good. The bugs will remain intolerable until fixed, the interface requires patience, and the sluggish scrolling may completely turn you off. The long dungeon is simply a matter of taste. We found this one particularly tedious, but if you liked *Icewind Dale,* you might be entertained. Despite the good parts, *Pool of Radiance* is less than it could have, or should have, been.

—THOMAS L. MCDONALD

MAXIMUMPC VERDICT

Pool of Radiance
UBISOFT

WHAT WE LIKE

Boasts an excellent combat system, terrific character models and environment, and the first use of *D&D* 3rd Edition rules.

WHAT WE HATE

Wrecks your computer and has limited RPG elements and a thin story. Screen scrolling is limited and slow, and the endless dungeon can be boring.

415.547.4000 www.poolofradiance.com
$45

5

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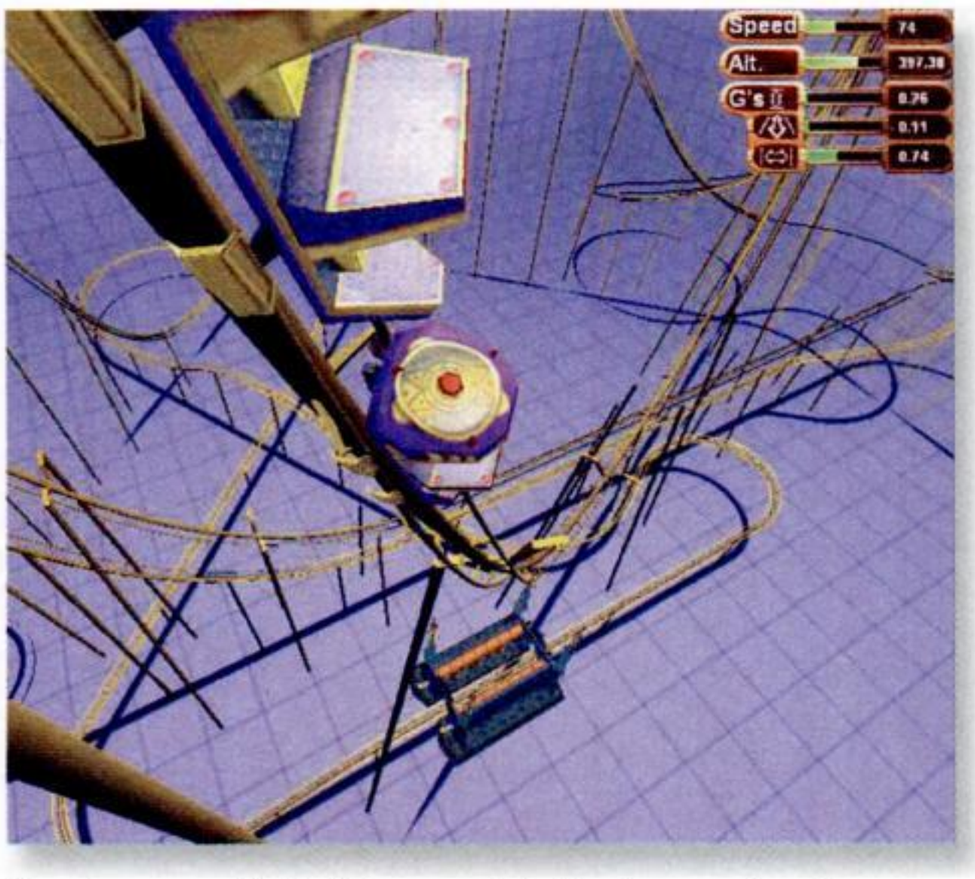
Ultimate Ride

A roller coaster game without all that messy gameplay stuff

The build screen, where you spend most of your time, drops the textures for the sake of speed and clarity.

The meeting went something like this:
Game Co. VP: "What's the most successful game out there?"
Designer: "That would be *Rollercoaster Tycoon*. It's been in the top 10 every week for almost two-and-a-half years."
VP: "Crikey! Why?"
Designer: "I'm not sure. It looks like crap and has all these icky financial and management elements that make my head hurt. I can't follow that stuff. I bet people just really like roller coasters, and they're willing to put up with that other junk just for a chance to build them."
VP: "I think you're right. And because a lot of people who really want to build roller coasters don't want to run a whole theme park, *we* should be able to win a much bigger audience by cutting out all that extra stuff and doing *just* a coaster game. Nothing but coasters! And we'll do it in 3D! It's like an Oreo made completely of icing."
Designer: "That would taste like crap."

Or so we imagine it went. *Ultimate Ride* does not taste like crap, but it does feel like something's missing. Build coaster? Check. Test coaster? Check. Ride coaster? Check. And then we... do it all over again... 'cause that's really all there is.



Coasters can be built on a plain background or in one of three "theme" environments: outdoors, outer space, and underground.

Don't get me wrong: Building coasters is a gas. While it's certainly one of the leading elements of both *Rollercoaster Tycoon* and *Simcoaster*, those games manage to put coaster construction into a larger context. This gives you something else to do, because, frankly, sitting in front of your screen watching a virtual theme-park ride for more than a couple minutes at a time is kind of wussy.

Ultimate Ride is a slick bit of fluff, largely succeeding at what it sets out to do. It provides a fairly simple set of tools for building coasters, then lets you ride your creation in 3D. The building screen offers a simplified view of the 3D world with the textures stripped away for speed and clarity. A tool palette enables you to place curved or straight track, then raise, lower, bank, add chains, and otherwise modify it. Gauges display the speed and G-forces created by the selected section of track.

It's all fairly easy to use but has its problems. Track can be "tweaked"—moved or twisted—only in set increments. This can create frustrating mismatches when trying to link up with another piece of track. The view control has a limited range, preventing you from looking everywhere. This can be annoying when you need to line up with an object that's above your view. And track must be laid consecutively, meaning you have to erase an entire coaster if you want to make a change near the beginning. All of it is rendered more difficult to grasp due to the absence of a manual and some all-but-useless online documentation.

Gameplay is split between a straight-up coaster construction set and an "Imagineering Mode." As an Imagineer, you're given a specific task, such as creating a coaster of a certain duration and G-force with two loops. The reward for success is another task. You can build steel, suspended, and wooden coasters in three different environments, dressing them up with an array of animated props. It all looks great, with a 3D engine that does a good job showing off coasters from a variety of angles.

In short, there are few complaints about *Ultimate Ride*. It lets you build and ride coasters in 3D. Period. It's more construction set than game, but that's not a knock. After all, some people don't like cleaning up after puking virtual guests.

—THOMAS L. MCDONALD

MAXIMUM PC VERDICT

Ultimate Ride
DISNEY INTERACTIVE

WHAT WE LIKE
It's a simple, efficient roller coaster construction set with respectable 3D graphics.

WHAT WE HATE
Niggling interface issues bugged us, as did the fact that the game's not much more than a construction kit.

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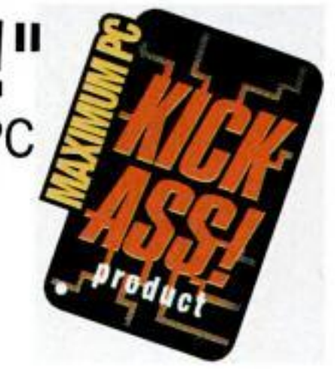

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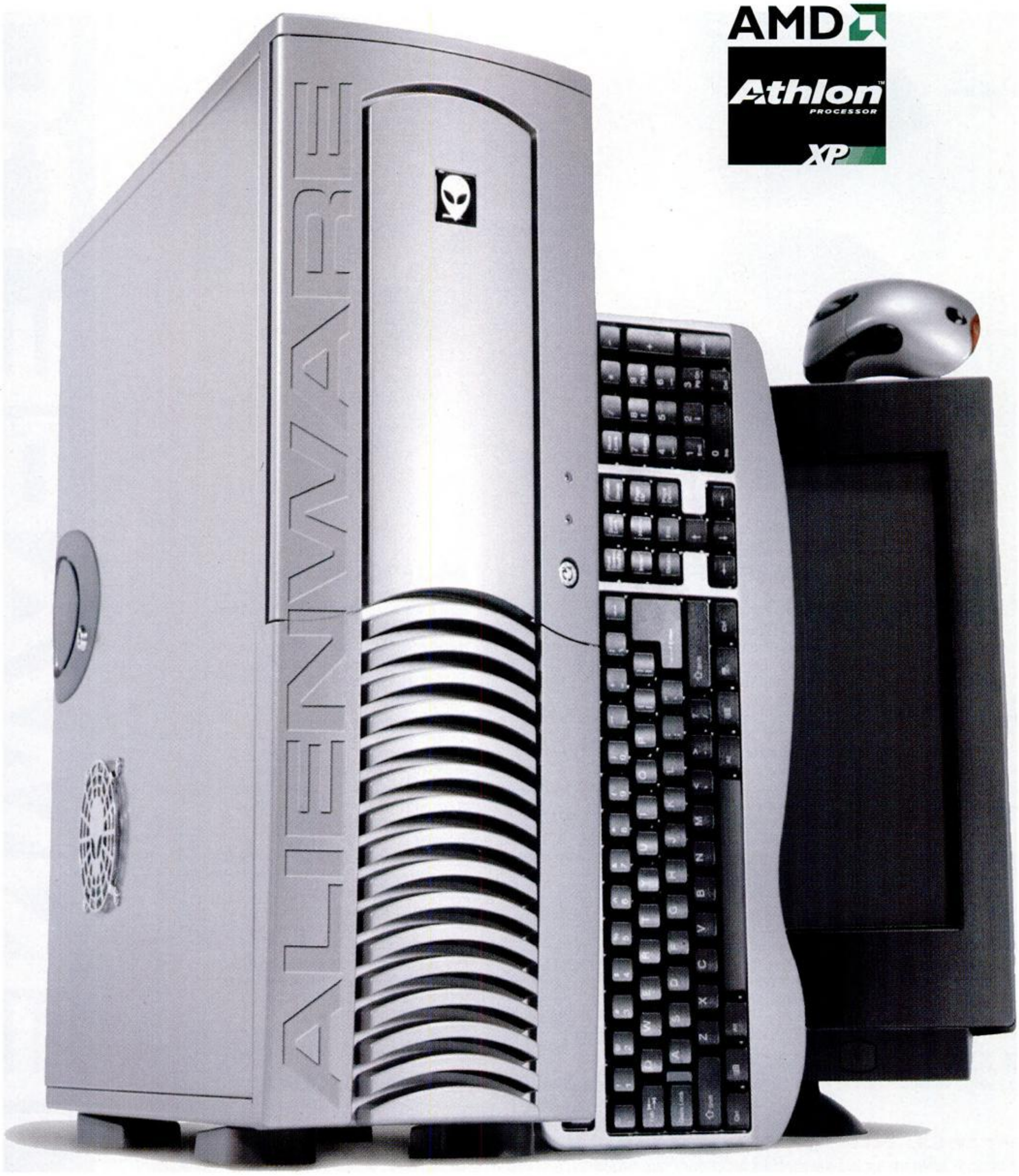

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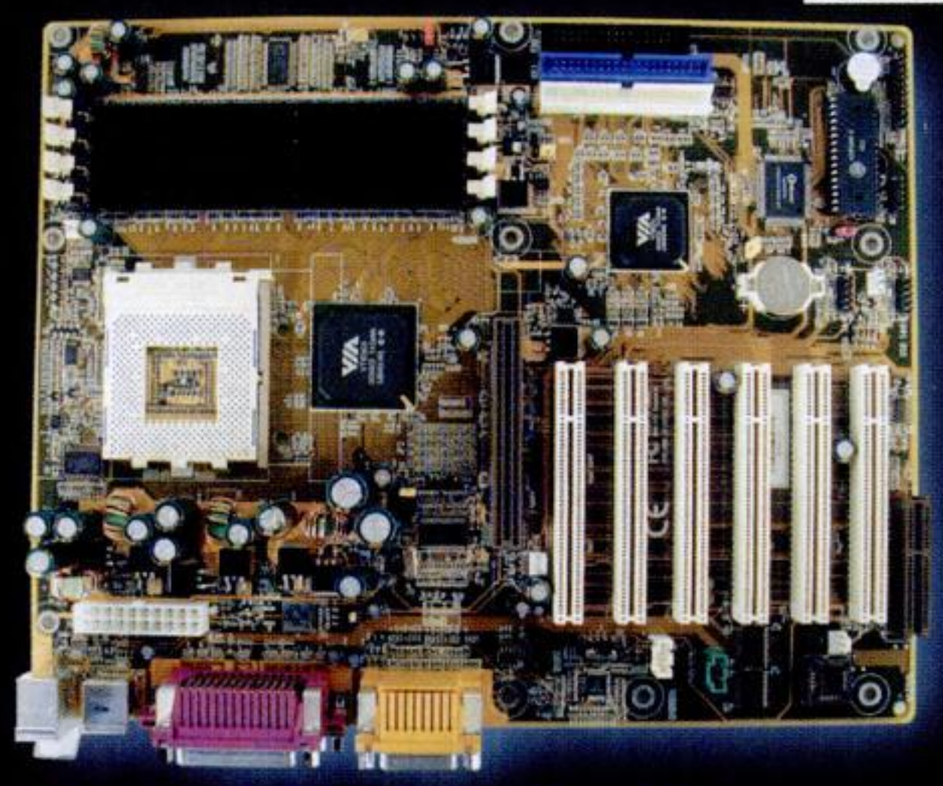

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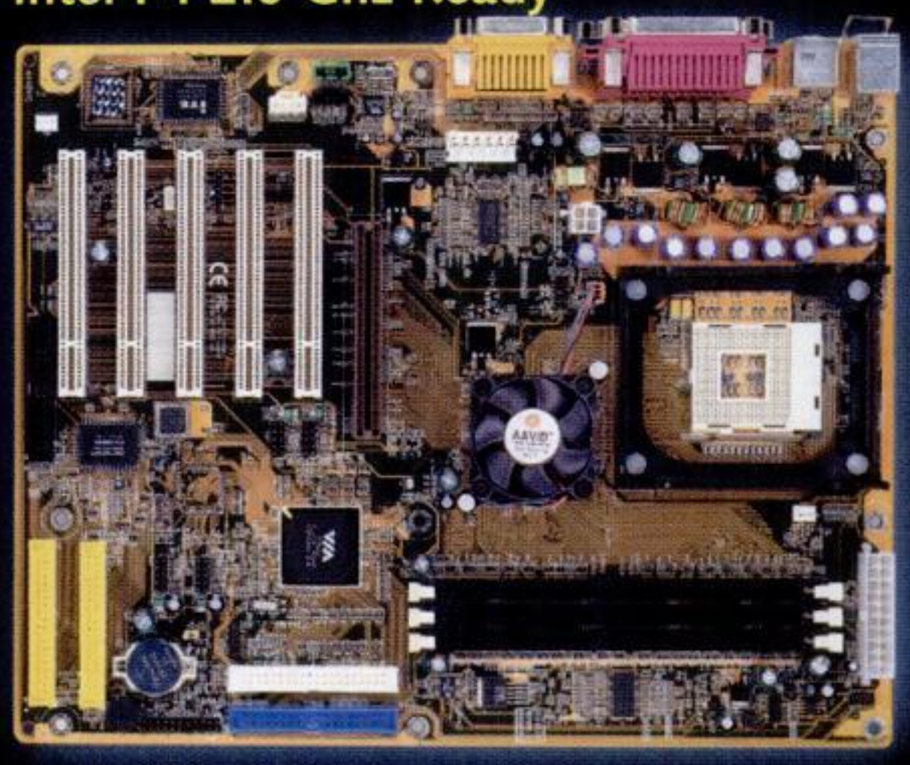

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10x/40x	SDCI	Pioneer DVD305S	$110	$135
CD-ROM Drives				
52x	IDE	Lite-On LTN525	$38	$63
52x	IDE	Creative Labs BLASTER52X	$35	$60
56x	IDE	BTC G621D	★$34	$59

SCSI Hard Drives

External add $99 SCA versions also available.

MAXTOR (Formerly Quantum)				
9.1GB	7200rpm	XC009L2	4mb	$151
18.4GB	7200rpm	XC018L4	4mb	★$174
18.4GB	10,000rpm	KW018L2	8mb	$206
36.7GB	7,200rpm	XC036L8	4mb	$321
36.7GB	10,000rpm	KW036L4	8mb	$390
73.4GB	10,000rpm	KW073L8	8mb	$763
SEAGATE				
18.4GB	7200rpm	ST318417W	2mb	$179
18.4GB	7200rpm	ST318437LW	2mb	$164
18.4GB	10,000rpm	ST318406LW	4mb	$216
36.7GB	7,200rpm	ST336737LW	2mb	$288
36.7GB	10,000rpm	ST336706LW	4mb	$400
181.6GB	7200rpm	ST1181677LW	4mb	$1418
IBM				
9.1GB	10,000rpm	07N3220	4mb	★ $182
18.3GB	10,000rpm	07N3210	4mb	$212
36.7GB	10,000rpm	07N3200	4mb	$400

Motherboards

SOCKET A Call for a great deals on a processors!!

ABIT	KG7	$130	KR7A	$139	
	KG7RAID	$149	KR7ARAID	$165	
ASUS	A7V266	$141	A7A266	$125	
	A7V266E	$179	A7N266	★$209	
IWILL	KA266PLUS	$102	KA266-R	$117	
	KD266	$81	KK266PLUS-R	$117	
FIC	AD11	$105	AZ11EA	$79	
Gigabyte	GA7DXR	$150	GA7VTXE	$105	
MSI	K7T266PRO2	$119	KT7266PRO2RU	$139	
Tyan	S2462UNG	$469	S2460	$215	

SOCKET 370 (Flip Chip/Celeron)

IWILL	DVD266	$139	DVD266-R	$172
Tyan	S2518GN	$355		

SOCKET 423/478 (Pentium 4)

ABIT	BW7	423	$126	BL7RAID	478	$150
	BW7RAID	423	$145			
ASUS	P4T	423	$170			
	P4TE	423	$170			
Gigabyte	GA8ITX	478	$165	GA8ITX-R	478	$195
INTEL	D850MV	478	$159	D845WNL	478	$145
	D845PT	478	$135	D845PTL	478	$145
Tyan	S2090	478	$115	S2266	478	$99
MSI	645ULTRA	478	$118	850PRO5	478	$155

Black Components

MONITORS

Viewsonic	17"	E70FB	1280 x 1024 - .21	$190
Viewsonic	17"	G70MB	1280 x 1024 - .23	$215
Viewsonic	19"	E90FB	1600 x 1200 - .21	$279
Viewsonic	19"	G90MB	1600 x 1200 - .22	$340
Viewsonic	15"	VE150MB	1024 x 768 LCD Flat	$449
Viewsonic	17"	VE170MB	1280 x 1024 LCD Flat	$829

Removable Drives

Mitsumi 1.44mb Floppy	$17
Teac or Sony 1.44mb Floppy	$21
LS120 120mb Removable Media Drive	$99
Iomega 100/250MB Zip IDE	$79/$109

SPEAKERS

Creative Labs		
CSW1500, 4 point surround	53W	$129
DTT2200, 6 Piece Desk Theatre 5.1	42W	$109
PS2000, 2 Pc Playwork Digital	22W	$175
DTT2500, 6 Pc Desk Theatre Dolby	42W	$213
Sonigistix Monsoon Flat Panel Speakers		
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MM2000, 5 Piece	340W	$229

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Wireless Freedom
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Ultimate Wish List

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OEM Home Edition
Must be sold with a Hard drive or CPU
$99

VisionTek GeForce3 64MB DDR AGP 4X with TV/S-Video Out $298
NVIDIA GeForce3
350MHz RAMDAC
2048x1536@60Hz
TV/S-Video Out
nfiniteFX engine

AMD Athlon XP 1900+ Processor $269
Athlon XP Desktop
1900+ Processor
1.6GHz
Socket A with QuantiSpeed Architecture

HP Jornada Pocket PC's HP564 $509
133MHz
Keep up with meetings, appointments, projects, deadlines, on the go! View Word, Explorer, Outlook in vibrant colors!

Creative Labs Sound Blaster Audigy PlatinumEX $219
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Motorola Talkabout T900 Wireless $145
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30 pack - $21

Asus A7V266E Socket A With RAID $175
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Hydraulic Case w/Window $159
300 Watt Mid ATX Hydraulic Case with Window Kit

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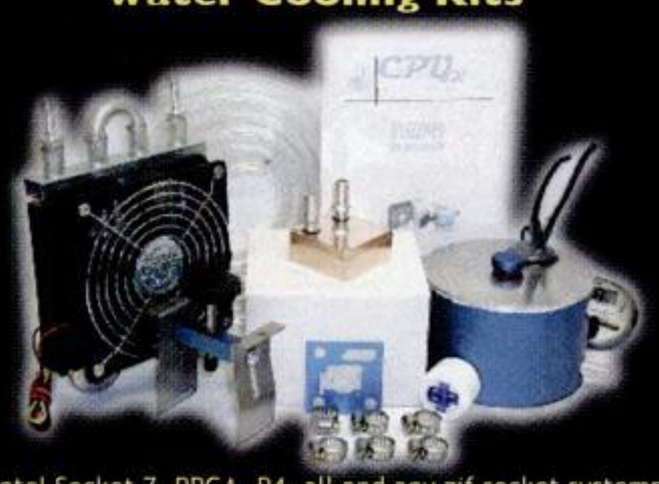
PC Mods

Water Cooling Kits



Intel Socket 7, PPGA, P4, all and any zif socket systems.
AMD All AMD socket zif style CPUs socket "A" or older K6

Radiator 5x5" finned surface area — Safety Shim , 6 Hose clamps, Arctic Silver
Sunon 120mm Fan (Low Noise) — Anodized reservoir (4.5" DIA 2.75" Height)
Plastic Tubing (3/32" wall ID 3/8" 1/2" OD) — 145GPH pump (3/8" fittings)
Copper Heat Exchanger (Aluminum 3/8 fittings) — Detailed installation instructions

CPUFX Complete Water Cooling Kit $199

Fans & Grills

Fan Grills

Radiation
80mm $17
92mm $19
120mm $22

Biohazard
80mm $18
92mm $20
120mm $24

Atomic
80mm $17
92mm $19
120mm $22

Swirl
80mm $19
92mm $22
120mm $25

Case Fans

Sunon	60mm	$9
Sunon	80mm	$13
Sunon	92mm	$17
Sunon	120mm	$21

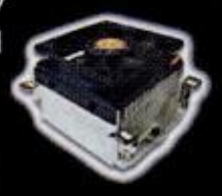
CPU Fans

Thermaltake DRAGON ORB 3 AMD Athlon 1.5GHz+ **$29**

Thermaltake VOLCANO 7 INTEL Socket 370 & AMD Socket 462 **$19**

Standard Grills

ThorTek	80mm	$13
ThorTek	92mm	$17
ThorTek	120mm	$21



Thermaltake VOLCANO P4 INTEL 478 up to 2.0GHz **$19**

Thermaltake Active Memory Cooling Kit Recommended for the PC-2100 & PC-100/133 SDRAM PCB Dimension **$19**

Arctic Silver II 99.8% pure micronized silver compound **$7**

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White, Red	

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Processor	AMD® Athlon® XP 1900+ (1.60GHz) 266Mhz FSB
Motherboard	ASUS® A7V266 "VIA VT8233" Chipset "Socket A" AGP Pro4x, ATA100, 5pci
Case	Black Mini-Cube ATX 6-5.25", 10-3.5" Bays.
Power Supply Cooling System	ATX Form Factor 300 Watt "Nightmare-Cube" Class Cooling System with Additional 120mm Fan
Memory	256MB Samsung® PC-2100 DDR SDRAM
Video Adapter	NVidia® GeForce3 Ti 500 64MB DDR DVI 4xAGP
Hard Disk Drive	IBM® 60GB "Deskstar" 60GXP 7200RPM ATA100
DVD-ROM Drive	Black Pioneer® 16x/40x EIDE Slot Load
Removable Storage	Black Sony® 1.44MB Floppy
Sound Adapter	Creative Labs® "Soundblaster" Audigy" XGamer
Speakers	Cambridge SoundWorks® Desktop Theater 5.1 Dolby Digital (sub, 5 speakers, zremote)
Network Adapter	3Com® Fast Etherlink 10/100
Game Controller	Microsoft® Sidewinder® Force Feedback 2 USB Joystick
Keyboard	Belkin® Black "Ergoboard" 108-Key PS/2
Mouse	Microsoft® IntelliMouse® Explorer Optical USB/PS2 5 Buttons with Scroll
Monitor	NEC® Multisync FE700+BK Black 17" .25mm dpi
Operating System	Microsoft® Windows® XP "Home Edition" OEM

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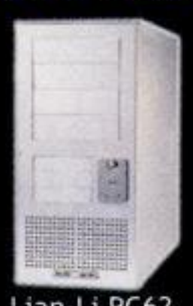

Lian-Li PC62 300Watt All Aluminum **$202**

Ultimate Black Case w/Side Fan 300watt **$99**

ThorTek Black Aluminum P4 300watt **$149**

ThorTek SuperMid P4 Black 320watt **$119**

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ThorTek	2.5" USB 2.0 Notebook HD Case	$85
ThorTek	2.5" Firewire & USB Combo Case	$109

Firewire Drives

Firewire Hard Drives

Buslink	20GB	Desktop Firewire Drive	$186
Buslink	40GB	Desktop Firewire Drive	$195
Buslink	60GB	Desktop Firewire Drive	$239
Maxtor	40GB	External 5400rpm Retail	$212
Maxtor	60GB	External 7200rpm Retail	$278
Maxtor	80GB	External 5400rpm Retail	$278
QPS	10GB	Quadslim Portable Retail	$225
QPS	20GB	Quadslim Portable Retail	$230
QPS	60GB	Ultraslim 7200rpm Retail	$272
QPS	80GB	Ultraslim 7200rpm Retail	$327
QPS	100GB	Ultraslim 7200rpm Retail	$403
WD	60GB	External 5400rpm Retail	$265

Firewire CDRW Drives

TDK	VeloCD 16x10x40 Firewire	$271
Yamaha	20x10x40 CRw2200FXZ Firewire	$306

Firewire DVD Drives

Addonics	8X DVD/24X DVD8X24FW	$296.00

USB Drives

USB Hard Drives

Buslink	20GB Desktop USB Hard Drive	$159
Buslink	40GB Desktop USB Hard Drive	$177
Maxtor	40GB 5400rpm USB Hard Drive	$186

USB Removable Drives

Iomega	100MB Zip Ext USB Drive 31197	$97
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Iomega	Peerless USB Drive w/10GB 31772	$316

USB CDRW Drives

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Plextor	8x8x24 USB 2.0 CD-RW	$257
Sony	24x10x40 USB 2.0 CD-RW	$280

Processors

AMD

AthlonXP	Desktop 1700 Retail	AXP1700BOX	$179
AthlonXP	Desktop 1800 Retail	AXP1800BOX	$245
AthlonXP	Desktop 1900 Retail	AXP1900BOX	$299

Intel

P4 478	1.7GHz Retail	BX80531NK170G	$220
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- ASUS® A7V266-E VIA® KT266A Motherboard
- Thermaltake® Dragon Orb Active CPU Cooler
- ***Black*** 'Mini-Cube' Case with 300 Watt PS
- Advanced Cooling with Dual 80mm, Single 90mm and Single 120mm "High Flo" Exhaust Fan with External Laser-Cut Grill
- 256MB Samsung® PC-2100 DDR SDRAM
- 75GB IBM® Deskstar™ 75GXP 7200RPM Ultra ATA100 Hard Drive
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- Klipsch® ProMedia™ 5.1 THX Certified 500 Watt Speaker System with Subwoofer
- Microsoft® IntelliMouse® Explorer Optical
- Belkin® ***Black*** Ergoboard™ 108-Key Keyboard
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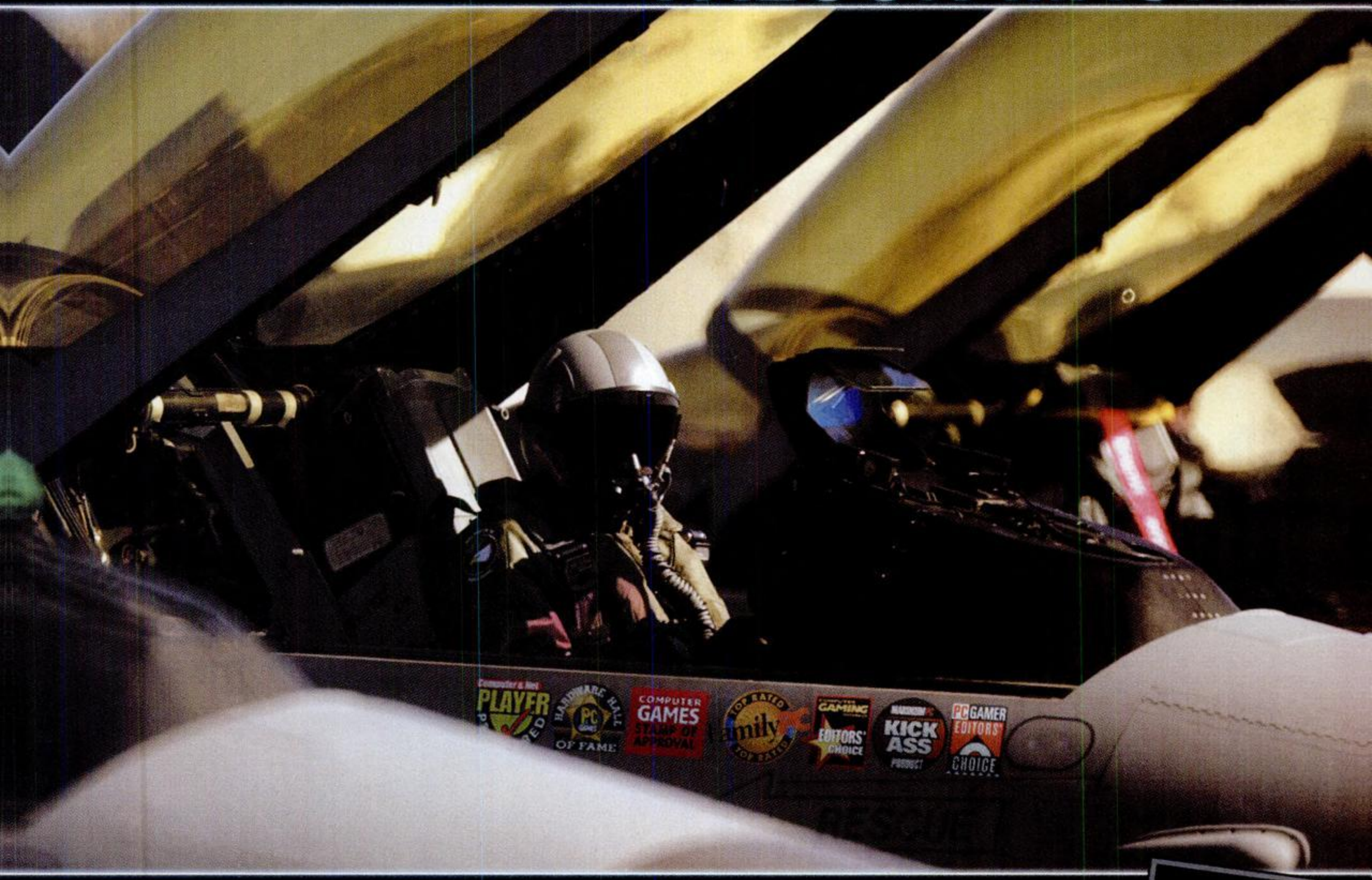

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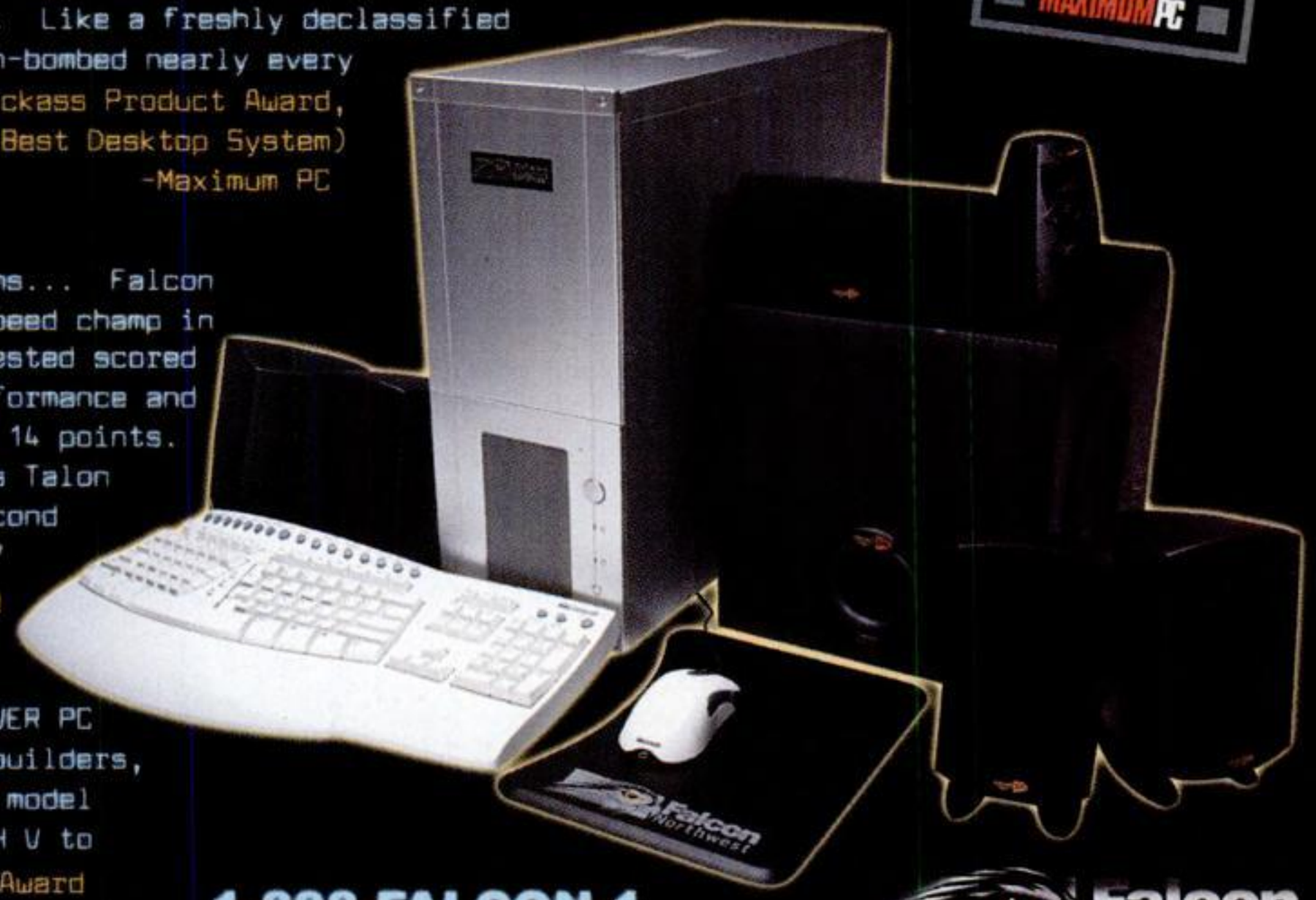
GEAR of the YEAR 2001 MAXIMUMPC

"If you thought the end of the Cold War meant a halt to weapons R&D, think again. Falcon Northwest's new MACH V proves that plenty of cash continues to flow into the campaign against the tyranny of slow 3D Gaming. Like a freshly declassified fighter-bomber, the system swooped in and precision-bombed nearly every benchmark record in existence." VERDICT: 10/10, Kickass Product Award, Gear of the Year (Best Desktop System)
-Maximum PC

"In total, we evaluated 7 power and 11 value systems... Falcon Northwest's MACH V game machine is the unrivaled speed champ in this lineup. ...the [Athlon XP 1800+] MACH V we tested scored a 121 on PC Worldbench 4, setting a record for performance and beating the fastest Pentium 4 system we tested by 14 points. This system is fast and fun." TALON 3.1: "...this Talon posted a stunning PC Worldbench 4 score of 116, second only to another Falcon - our power list's [MACH V]"
- PC World

"FALCON SETS A NEW HIGH-WATER MARK WITH ITS BEST-EVER PC The Falcon team have always been excellent system builders, but this new computer is the cleanest, best-cabled model we've ever seen from them. It's Falcon's best MACH V to date. We're smitten." Score: 95%, Editor's Choice Award
- PC Gamer



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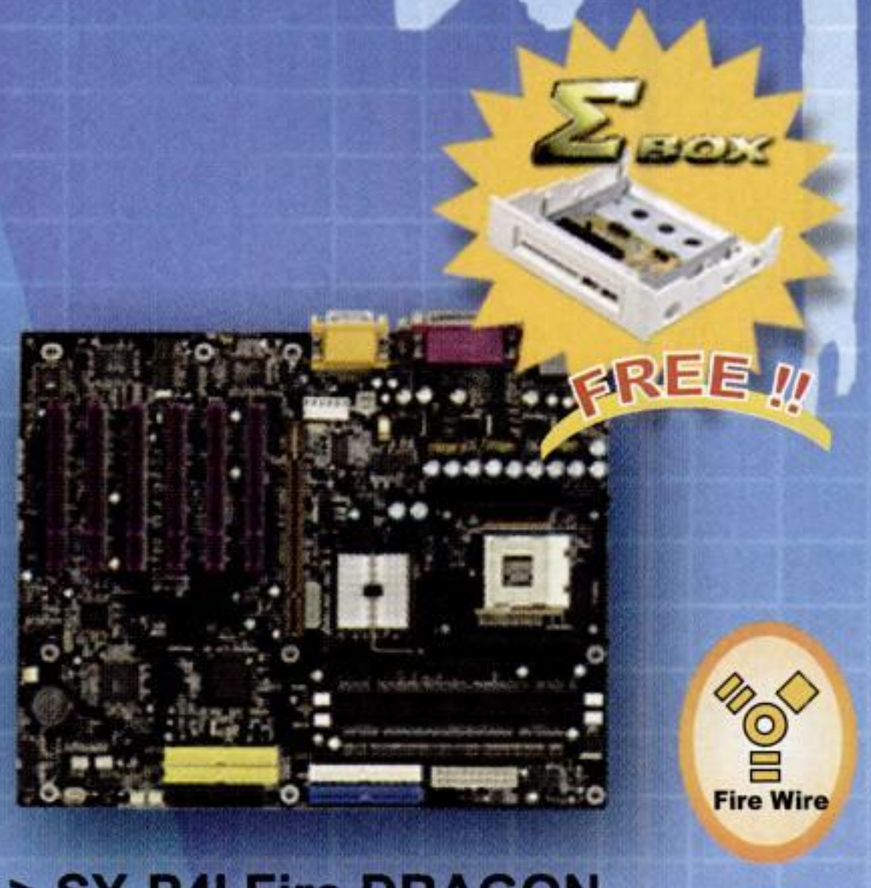
- Package including " Σ-BOX"



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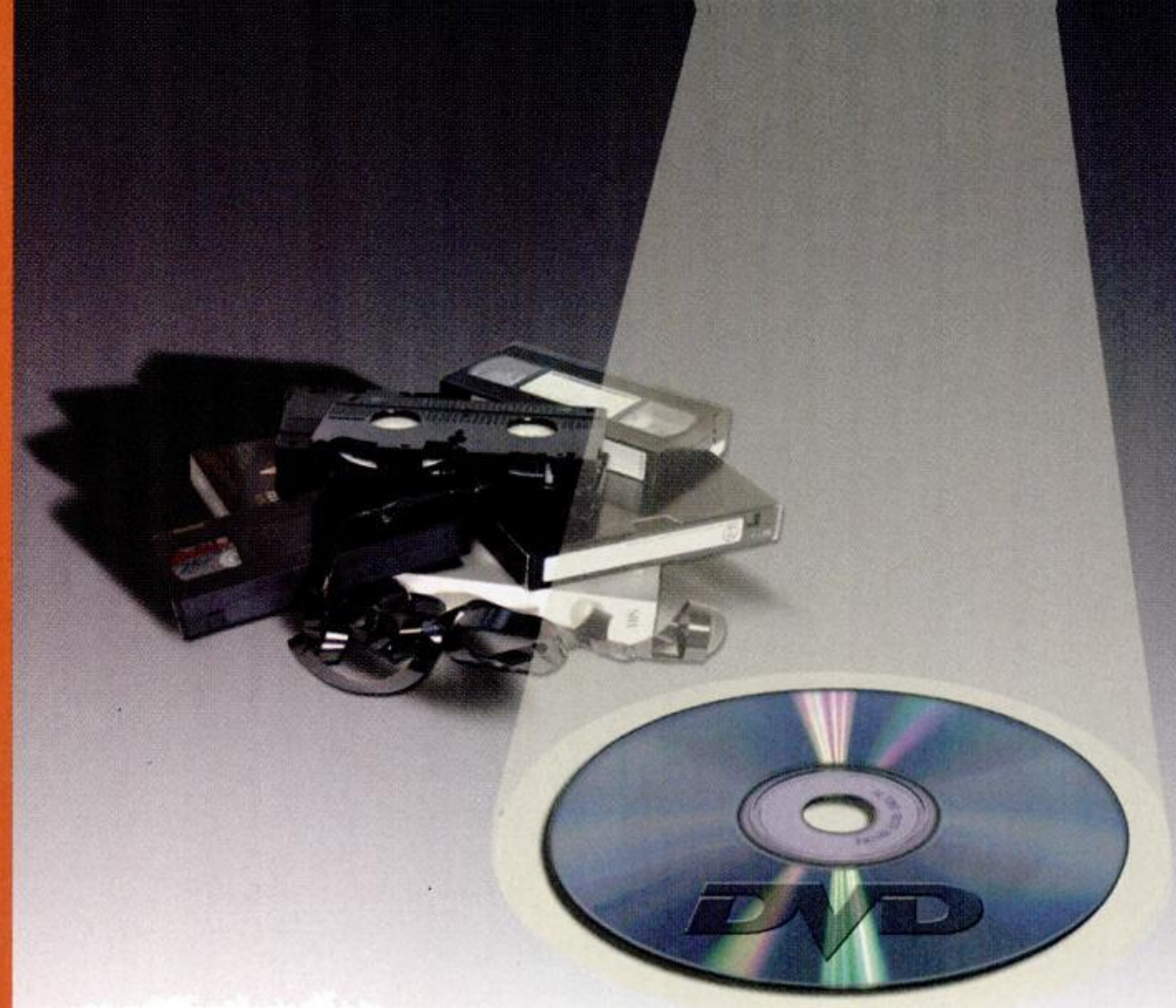

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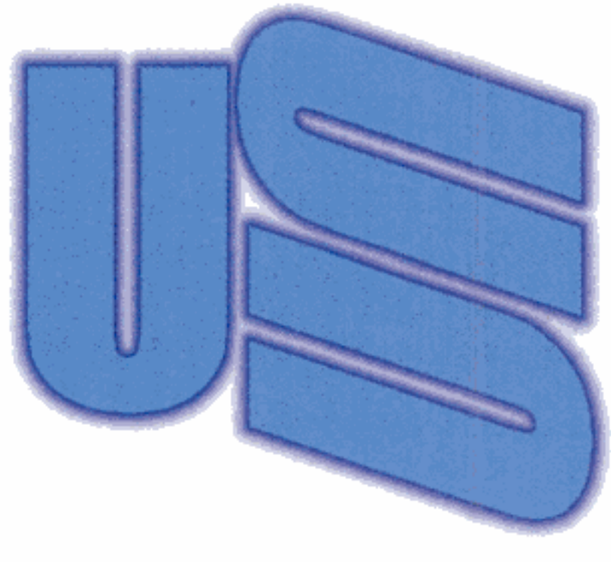

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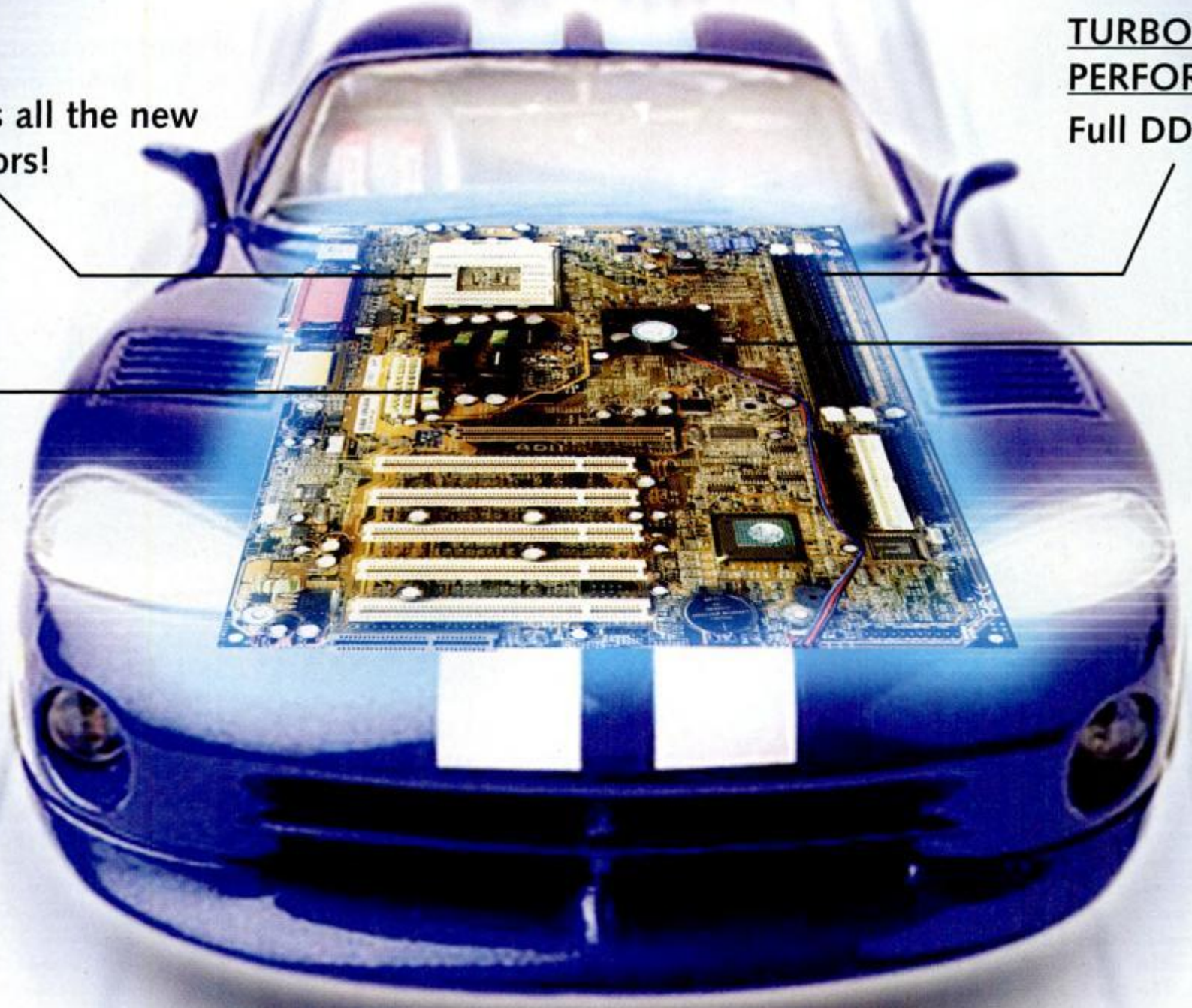

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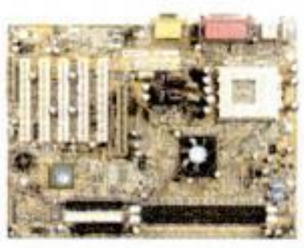

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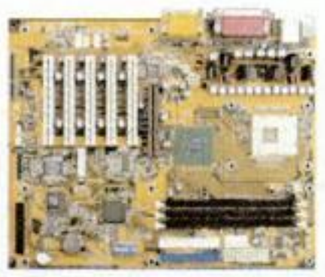

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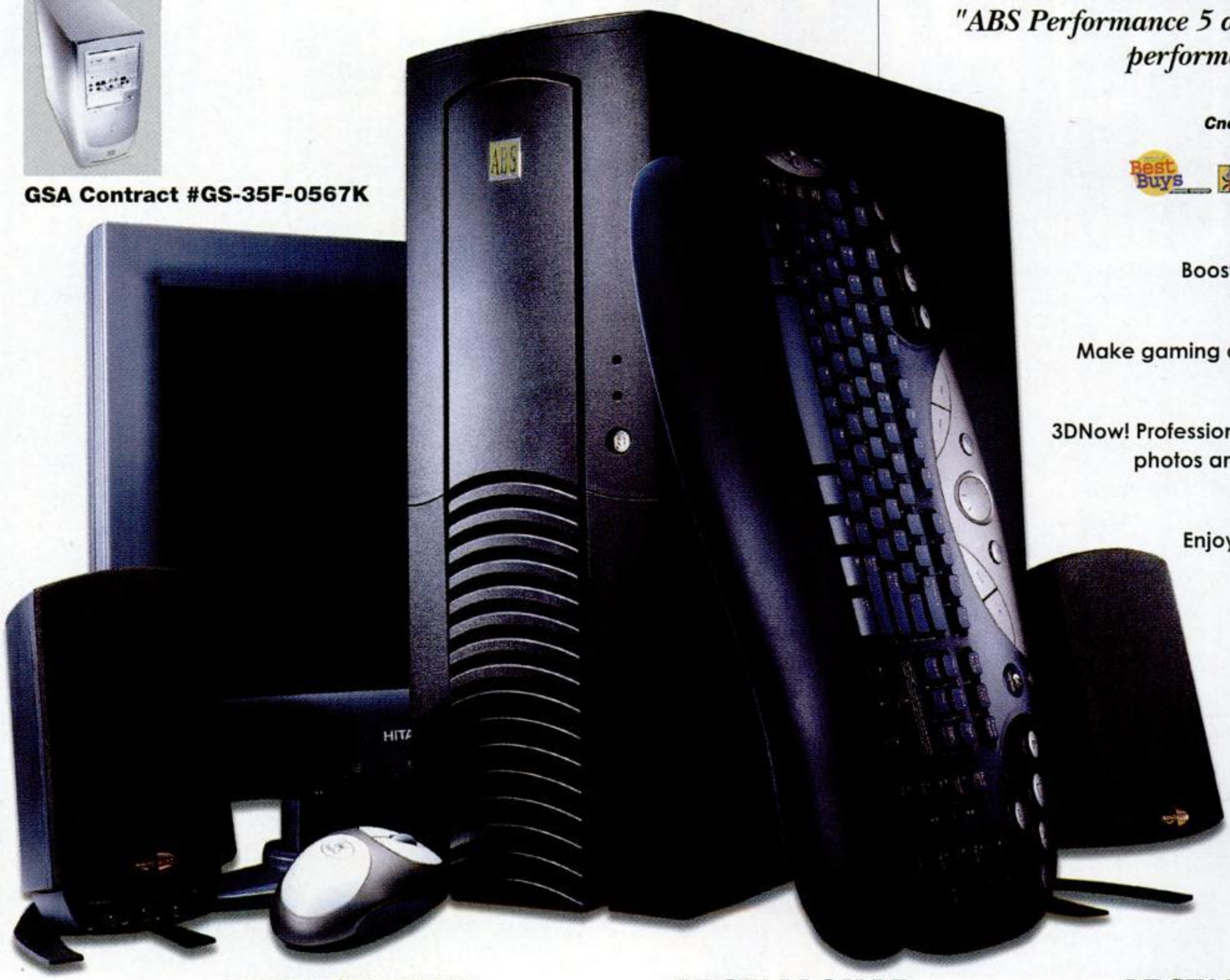

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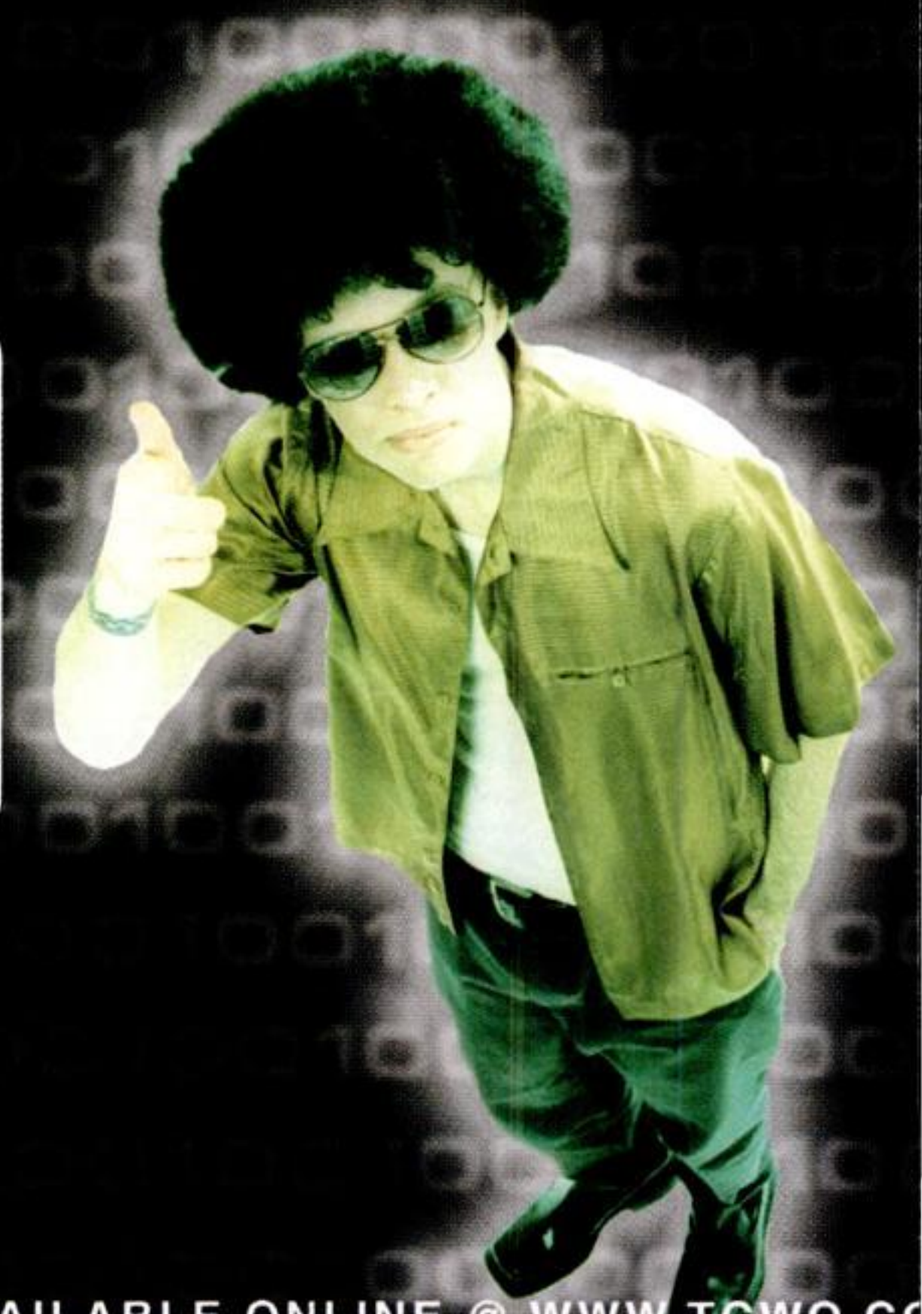

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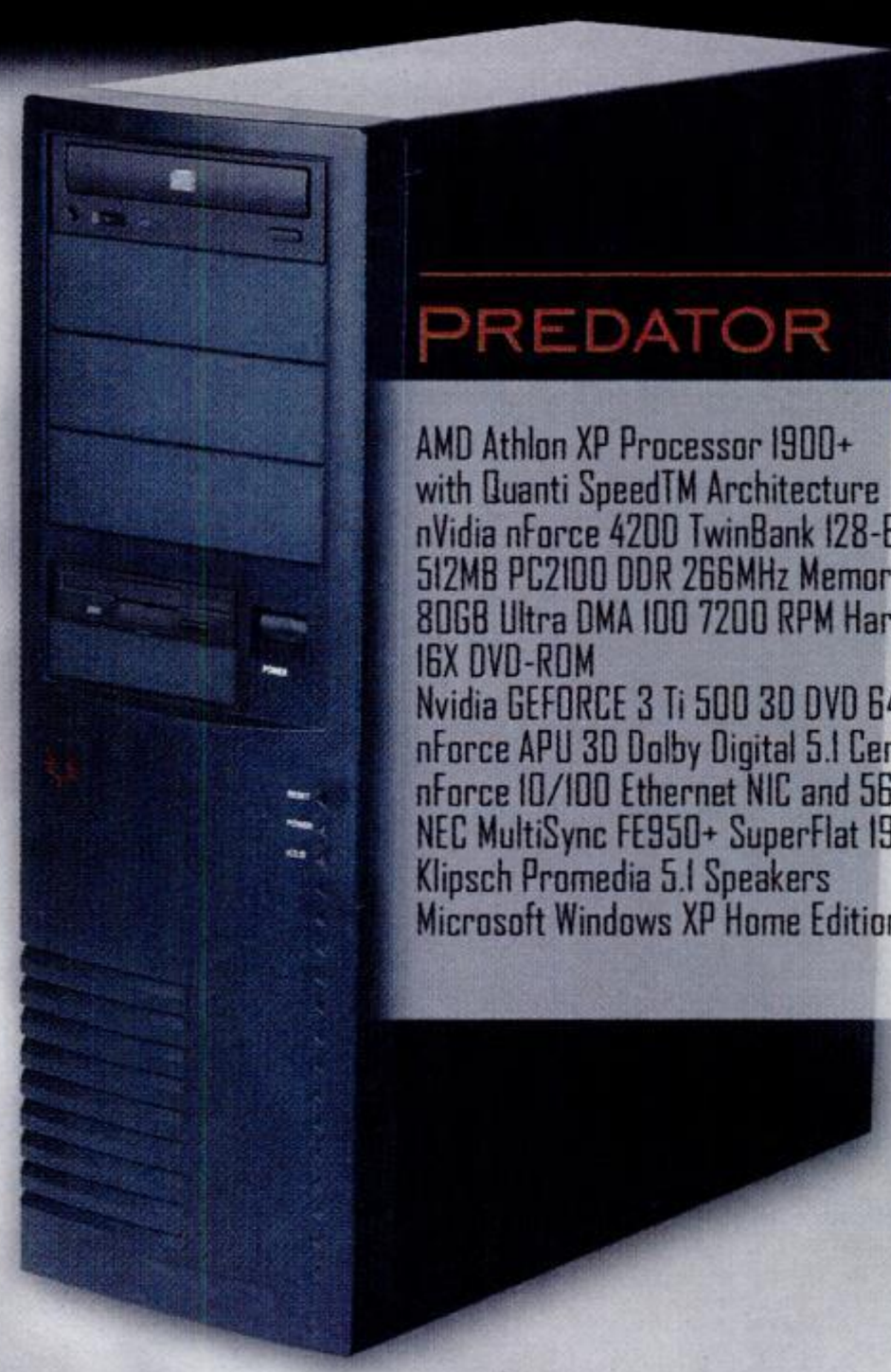

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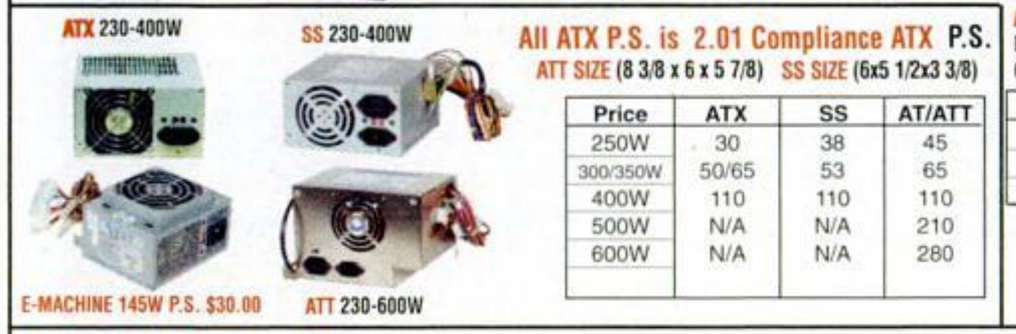

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MODEL/ SPECS	Bare Bone	Dimension W.D.H	I/O ports	5.25"	3.5"	PCI	PCI ISA
105LPX socket 370	255	12x13x3.1	PS2 KB,mouse,VGA,USB,RJ45.2S,1P,AUDIO, GAME	1	1/1	3 or 0	
105LPX TV	275	12x13x3.1	PS2 KB,mouse,VGA,USB,RJ45.2S,1P,AUDIO,GAME,TV	1		3 or 0	
109NLX socket 7	175	12.3x16x3.9	PS2 KB,mouse,VGA,USB,RJ45.2S,1P,AUDIO,GAME, IR	1	1/1	2	1
111M.NLX 370	260	11.5x10.6x2.5	PS2 KB,mouse,VGA,USB,RJ45.2S,1P,AUDIO, GAME,1394	w/slim CD	0/2.5 HD	2 or 0	
192 M.ATX 370	185	13.8x16.5x3.4	PS2 KB,mouse,VGA,USB,RJ45.2S,1P,AUDIO,GAME	1	1/1	3 or 0	
192B M.ATX 370	185	13.8x16.5x3.4	PS2 KB,mouse,VGA,USB,RJ45.2S,1P,AUDIO,GAME	1	1/1	3 & 0	

Case Specification & Price List

Model	Price	Dimension W.D.H.	MB Size	5.25 Ext./Int.	3.5 Ext./Int.	P.S.
R02/BARE	180/300	19x17.6x3.5	M.ATX	1/0	1/1	150W
R04B/W	275	19x24.3x3.5	ATX	1/0	1/3	250W
R05B	430	19x242x3.5	ATX	1/0	1/4	430W
R06B	250	19x20.2x5.25	ATX	4/0	1/5	300W
R08 B/W	1550/1800	19x22x3.5				
R10 B	175	19x17x7	ATX	3/0	1/1	300W
R14 B/W	215	19x21x7	ATX	3/0	1/3	300W
R15	295/510	19x24.4x7	ATX	6/0	2/2	300W
R16 B/W	225	19x18x7	ATX	3/0	1/2	250W
R17 B 4U	215	19x21x7	ATX	3/0	1/2	250W
R20 B/W	275	19x20.5x7		8/0		300W
R21 B/W	275	19x18x7		8/0		300W
R22R/B/W	635/950	19x23.3x10.5	ATX	8/0	1/0	300W/R
R26R/B/W	630/850	19x22.6x10.7	ATX	4/0	2/4	300W/R
R28	290	19x17x8.7		8/0		300W
RSP	18	5.8x9.3x1.6			1	
RSM169-100	65/75	5.8x9.3x1.6			1	
001B	75	10x11.5x3		1/0		60W
001B1	65	8.3x10.6x2.8		1/0		50W
002B	88	6.9x14.6x5.8		2/0		60W
002B1	78	7.5x11.2x6.5		2/0		80W
004B	105	6.8x15.3x9.3		4/0		230W
004B1	100	7.5x17.3x10.2		4/0		200W
007B	180	7x15.8x13		7/0		250W
008B	280	8.4x20.2x18.3		8/0		300W
008B1	180	7.5x17.9x17.1		8/0		250W
105LPX/TV	255/275	11.9x12.6x3	LPX	1/0	1/1	90W
109(SP 98) bare	175	11x12.3x3.9	NLX	1/0	1/1	135W
111N bare	260	11.6x10.6x2.5	M.NLX	1/0	0/1	100W
192M.ATX/B	85	13.1x16.5x3.5	M.ATX	1/0	1/1	150W
224	75	17.4x18.8x6.1	ATX	3/0	2/2	230W
267	70	16.8x16.8x6.2	ATX	2/0	2/1	250W
271	85	17.3x15.9x5.5	ATX	2/0	1/1	250X
288	75	16.9x17x6	ATX	3/0	2/1	230W
304	55	7.9x18.8x13.9	ATX	3/0	2/1	300W
325B	55	8x18.5x17	ATX	3/0	2/1	235W
327	72	7.5x16.5x17.3	ATX	3/0	2/2	230W
337	75	7.8x18.8x16.5	ATX	3/0	2/2	300W
338	55	7x14.7x13.8	M. ATX	2/0	2/1	145W
366	50	7.2x15.5x14.3	M. ATX	2/0	1/1	235W
367	55	7.7x16.5x17	ATX	3/0	2/1	235W
370	80	8.3x17.3x16.1	ATX	3/0	2/2	250W
392	80	7.5x17x17	ATX	3/0	2/2	250W
393	90	9x17.5x17.5	ATX	6/0	1/1	250W
396	55	8.3x17x15.5	ATX	3/0	1/3	230W
401	110	8.5x17.3x18	ATX	2/0	2/2	250W
405B	75	7.8x17.5x17.2	ATX	4/0	2/2	320W
408	80	8.2x19.8x18.4	ATX	3/0	1/5	250W
409	295	9.5x22x18.1	ATX	4/0	2/5	300W
411	67	7.2x17.2x16.8	ATX	4/0	2/1	250W
412	67	7.2x17.2x16.8	ATX	4/0	1/2	250W
413S/BL	67	8.5x19.5x18	ATX	4/0	2/1	250W
415	75	8.8x19.5x19.7	ATX	8/0	1/0	300W
418B/W	115	8.1x18.8x21.4	ATX	4/0	2/4	300W
422	70	7.7x16.6x18.1	AT	4/0	1/4	250W
424	70	7.5x18.9x16.7	ATX	4/0	2/1	250W
426B/W/S	70/75	7.5x17.5x19.3	ATX	3/0	2/2	250W
427	75	7.5x16.5x17.3	ATX	3/0	2/2	250W
436	70/85	8.6x18x15.6	ATX	3/0	2/2	250/300W
442	60	8x18.25x16.3	ATX	4/0	2/1	300W
455	110	8.5x17.5x18.6	ATX	4/0	2/3	250W
465	185	9.3x17x17.2	XEON/ATX	2/0	2/2	300W
467	75/90	7.5x16.7x18.8	ATX	3/0	1/4	250W/300W
470	110	8.3x17.3x21.3	ATX	4/1	1/2	250W
471	110	8.4x17.5x21.3	ATX	3/1	1/4	250W
472	60	7.5x18x17.6	ATX	4/0	2/2	250W
474	285	7.8x17.2x17.2	ATX	4/0	2/2	300W
476	70	8x17.2x17	ATX	4/0	2/2	300W
478	155	7.9x18.4x16.4	ATX	4/0	2/1	300W
479	155	7.9x18.4x16.4	ATX	4/0	2/1	300W
480	195	7.8x18x16.5	ATX	4/0	2/1	300W
482B	80	7.8x19.8x17.5	ATX	4/0	2/2	250W
486	67	9.6x19.5x17	ATX	4/0	2/1	250W
489**	80	7.3x17x17	ATX	3/0	1/2	235W
492	229	8.3x17.5x17.6	ATX	4/0	3/5	300W
493B	234	8.3x17.5x17.6	ATX	4/0	3/5	300W
496	60	8.25x17.8x16.5	ATX	4/0	1/3	250W
501	155	8.25x17.2x23.8	ATX	4/0	2/4	300W
503R/B	455	14.8x20.4x18.4	ATX	8/0	2/4	300RW
503/B	295	14.8x20.4x18.4	ATX	8/0	2/4	300W
505	555	14.6x23x26.8	ATX	12/0	1/8	300W
505R	670	14.6x23x26.8	ATX	12/0	1/8	300RW
506/R	155/370	7.8x16.5x24.4	ATX	6/0	2/2	300W/R
518	145	8.1x18.5x26.5	ATX	6/0	2/6	300W
524	380	13.9x25.6x19.1	ATX	7/0	1/2	300RW
526B/W	105/120	7.5x17.5x24.5	ATX	6/0	1/4	250W/300W
528	95/110	7.5x16.5x24.8	ATX	6/0	1/5	250W/300W
536	93/108	7.8x17x24	ATX	5/0	1/5	250W/300W
538	290	8x20.5x24.5	ATX	5/0	1/6	300RW
560/R	290/445	15x24.5x23.5	ATX	11/0	2/4	300W/300R
562/R/B/W	250/470	8.7x17.9x26.8	ATX	9/1	1/0	300W/300R
563/RB/W	145/370	8.7x17.9x26.8	ATX	10/0		300W/300R
565	185	9.25x18.3x21.2	XEON/ATX	4/0	2/4	300W
568	95/110	7.5x17x22.8	ATX	5/0	2/4	250W/300W
569B/W	210	13.5x17.8x14	B/ATX	6/2	0/8	300W/300W
570/R	150/370	8.3x17.3x26.4	ATX	7/1	1/2	300W/300R
571/R	160/370	8.3x17.3x26.4	ATX	6/1	1/2	300W/300R
582	105/120	7.8x16.5x23.2	ATX	6/0	2/1	250W/300W
588	99/114	7.8x16.5x23.3	ATX	5/0	1/3	250W/300W
1620/R	950	16.5x20.3x34.3	F/ATXx2	16/0		300R

Model# Starts with:
1 for Slim Case
2 for Desktop Case
3 for Mini-Mid Case
4 for Mid Case
5 for Full/File Server Case
Side Open: Side Panel can be removed independently
Slide Door: Sliding front door up and down
Slide MB Plate: Motherboard tray ca slide in and out form rear

*Case Color: Blue, Purple, Green, Orange, Red.
**Case Color: Blue, Purple, Green, Red, Black.

MB SIZE = MOTHERBOARD SIZE • F= FULL SIZE • B= BABY SIZE
X=ATX • M. ATX= Micro ATX
R= REDUNDANT POWER SUPPLY WITH HARDSWAP
250XB= Ball Bearing

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MAXIMUM PC Rig of the Month

THIS MONTH: Antony Winn's GTRPC

Oh, no—no, he didn't!" That was our reaction when we first saw the GTRPC. For years, we've been bandying about the idea of undertaking a similar project, but we never had the nerve—or perhaps the word is "audacity"—to stuff an entire PC inside a 1/8th-scale model hot rod. But caution—or perhaps the phrase is "common sense"—doesn't appear to be in Antony Winn's vocabulary.

Winn, one of our rare Australian readers, writes on his web site, "Why? Simply because we [Winn himself, Greg Mitchell, and James Taylor] thought it would be cool, and we wanted a portable machine for LAN events. Like many people, we just got sick of the same old square boxes and thought we'd do something a little out of the ordinary."

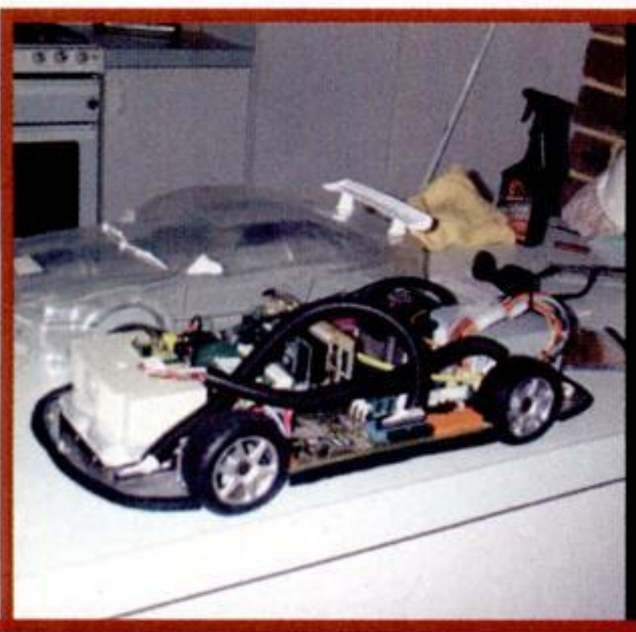
Out of the ordinary? How about downright insane?

Maximum PC is in many ways patterned after the archtypical hot rod magazines. And when people ask us to define our typical reader, we often say, "He's like the guy whose Camaro is in a perpetual state of disassembly on the front lawn. His PC is always open because he's always upgrading." Now, the Nissan GTR isn't a Detroit pony car—it's a super-tuned Japanese rocket that made its mark during Australian touring car championships—but it does evoke speed, power, and badass coolness. We tip our collective hat to Winn for fashioning this most roadworthy of PCs. You can read more about it by visiting **http://members.iinet.net.au/~winndyne/**.

If you have a contender for Rig of the Month, e-mail **input@maximumpc.com** with pics and a brief write-up.

If you have any doubt the GTRPC is a fully working, hardcore-caliber rig, here are the rig's essential specs:

MOTHERBOARD ABIT KT7A-RAID
CPU AMD Duron 600MHz OC'd to 910MHz (140x6.5/1.8v)
MEMORY 256MB Kingmax PC150 SDRAM
VIDEO ASUS V7100AGP Geforce2 MX 32MB
SOUND Sound Blaster PCI 128 (mounted in riser at 90 degrees)
STORAGE 20GB Seagate Barracuda II
EXTERNAL I/O Custom-mounted brackets and extensions for VGA Out, S-Video-out, LAN, and USB
POWER SUPPLY 145w Micro ATX, modified with cutaway housing and 4900rpm 80mm Sunon Fan
COOLING ThermoEngine with 60mm 4500rpm YS-Tech Fan
REMOTE CONTROL Just Cooler Keychain and receiver
KEYBOARD/MOUSE Microsoft Natural Pro USB/Microsoft Wheelmouse Optical USB
INTERNAL CASE TEMP UNDER LOAD 37° C
CPU TEMP UNDER IDLE/LOAD 45/51° C
As Winn says, "The wheels act as exhaust vents, and you can feel the hot air coming out of them if you put your hand near them. It's enough to warm your beer—an important thing to keep in mind during LAN events."



Winn says the GTRPC was a four-month project and involved a laborious amount of finagling to make everything fit. For example, he had to manually extend his USB cables, cut directly into his power supply shell to increase CPU cooling, and manually hardwire both his videocard and soundcard connections. He ultimately painted the clear shell with Pactra Mettallic Red Paint.

"We chose the Nissan GTR because it was the only 1/8th-scale body shell we could fit an ABIT KT7A-RAID motherboard under. We could have used a MicroATX board, but AMD MicroATX boards don't have any overclocking features, and we wanted to make a top-notch machine.... But a MicroATX board would have eliminated the need for a lot of the mods, like cutting away the wheels and soldering the video connector to the back of the videocard."

The "working" headlights indicate system power, the tail lights indicate hard drive activity, and the indicator lights indicate standby. Notice the yellow circuit board on top with the antenna sticking out? That's the remote control unit—for the keychain remote, which handles Power On/Off and Reset. Sadly, the GTRPC isn't an "RC" car in the traditional sense, as the wheels no longer move.

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- Add a Defcon Notebook Security Device, add $39

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- Sound Blaster® Compatible Sound with Wavetable
- 59WHr Li-Ion Battery with ExpressCharge™ Technology
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$1999 or as low as **$69**/mo for 45 mos.[12]
No payments for 90 days for qualified customers.
E-VALUE Code: 00502-801219m

Recommended upgrades:

- Add a 2nd Bay 8X Max CD-RW Drive, add $179
- 3-Yr Limited Warranty,[2] Mail In Service & 24x7 Phone Support, add $119

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E-VALUE Code: 00502-501208q

Recommended upgrade:

- 40GB[5] Ultra ATA/100 Hard Drive (7200 RPM), add $20

Dimension™ 4300 Desktop

Superior Performance, Smart Value

- Intel® Pentium® 4 Processor at 1.70 GHz
- 128MB SDRAM at 133MHz
- 40GB[5] Ultra ATA/100 Hard Drive (7200 RPM)
- 17" (15.9" vis, .27dp) E771 Monitor
- 16MB ATI® Rage™ Ultra Graphics Card
- 48X Max CD-ROM Drive
- 16X/10X/40X CD-RW Drive with Roxio's Easy CD Creator®
- SB Live! 1024V Digital Sound Card
- Harman Kardon® HK-195 Speakers
- 56K[6] PCI Telephony Modem for Windows®

$1099 or as low as **$33**/mo for 45 mos.[12]
No payments for 90 days
for qualified customers.
E-VALUE Code: 00502-501210

Recommended upgrade:

- 256MB SDRAM, add $80

Dimension™ 8200 Desktop

Cutting Edge Technology

- Intel® Pentium® 4 Processor at 1.80 GHz
- 256MB PC800 RDRAM
- 40GB[5] Ultra ATA/100 Hard Drive (7200 RPM)
- 17" (15.9" vis, .27dp) E771 Monitor
- NEW 64MB NVIDIA™ GeForce2 MX Graphics Card with TV-Out
- 16X Max DVD-ROM Drive
- 16X/10X/40X CD-RW Drive with Roxio's Easy CD Creator®
- SB Live! 1024V Digital Sound Card
- Harman Kardon® HK-395 Speakers with Subwoofer
- 56K[6] PCI Telephony Modem for Windows®

$1499 or as low as **$45**/mo for 45 mos.[12]
No payments for 90 days
for qualified customers.
E-VALUE Code: 00502-501214

Recommended upgrade:

- 19" (18.0" vis, .26 dp) M991 Monitor, add $80

Dell | Standard Features

Each DELL system shown here has a number of standard features, including:

- MS® Windows® XP Home Edition
- MS® Works Suite with MS® Money Standard
- Dell Jukebox powered by MusicMatch
- 6 Months America Online™ Membership Included[7]
- Dimension™ Desktops shown here include 1-Yr At-Home Service,[4] 1-Yr Limited Warranty,[2] 1-Yr 24x7 Phone Support
- Inspiron™ Notebooks shown here include 1-Yr Mail-In Service, 1-Yr Limited Warranty,[2] 1-Yr 24x7 Phone Support

Dell | Solutions

Software and Accessories

- Epson® C80 Color Printer, $179
- Canon® 1240U scanner, $199
- Lexmark™ All In One Print Center, $199
- HP® 318 Camera, $199

Service and Support

How about some peace of mind to accompany your new Dell™ system?

Dimension™ Desktop Service Upgrades:

- Upgrade Dimension™ Desktops with 1-Yr Ltd Warranty,[2] 1-Yr At-Home Service[4] and 1-Yr 24x7 Phone Support: 3-Yr Ltd Warranty,[2] 3-Yr At-Home Service[4] and Lifetime 24x7 Phone Support, add $119 (4300S and 4300 series) or add $139 (8200 series)

Inspiron™ Notebook Service Upgrades:

- Upgrade Inspiron™ Notebooks with 1-Yr Ltd Warranty[2] and 1-Yr Mail-In Service to: 3-Yr Ltd Warranty,[2] 3-Yr Next-Business-Day On-Site Service[4] and 24x7 Lifetime Phone Support, add $219

Everything you'd ever want in a PC starts right here. Whether you're looking for high-performance multimedia to take on the road, or a versatile desktop that's perfect for home, Dell can custom-build a solution that is just right for you. And by making PCs to order and shipping direct instead of using a middleman retailer, Dell is able to give you the very latest technology at a low price, all backed by an award-winning service and support team that knows your PC like it's their own.So go online or call today, and discover a better way of finding, buying, and owning the perfect computer. A better way that's easy.

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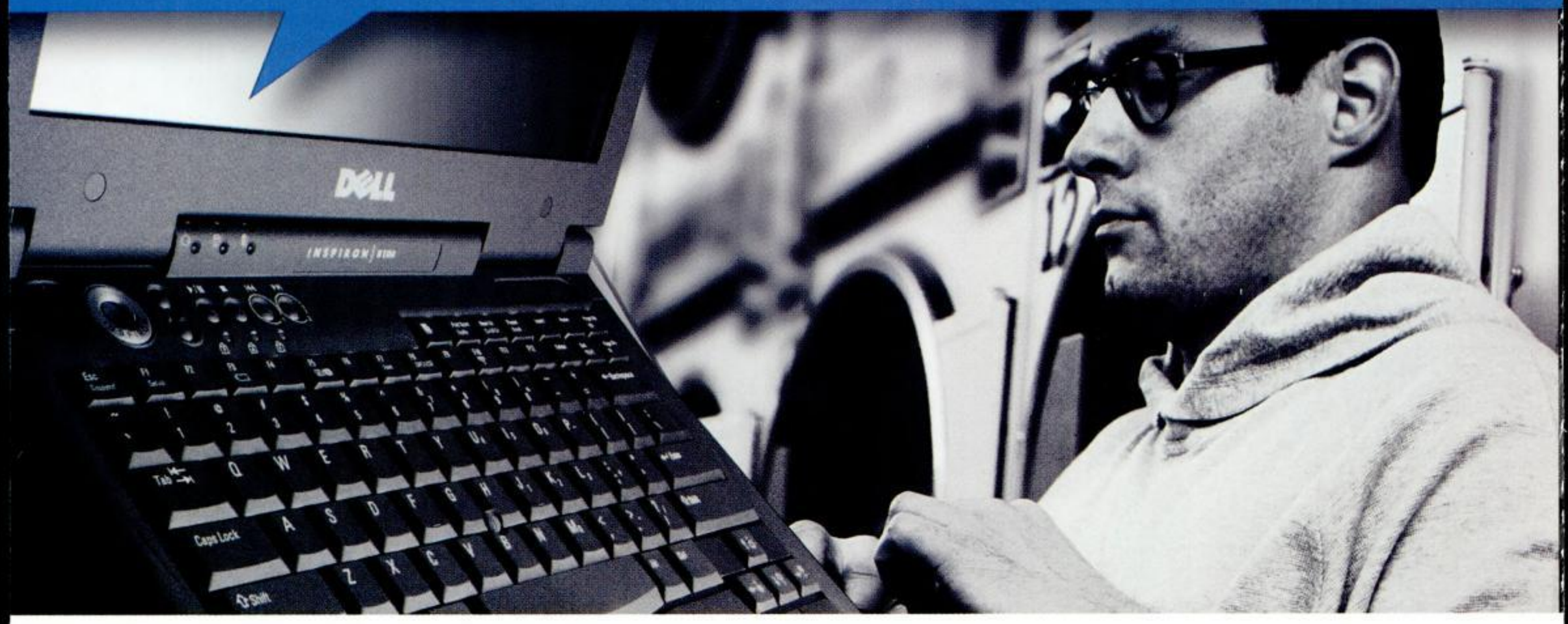
You just couldn't get it out of the house.



Dell | Home

Inspiron™ 8100 Notebook

The Ultimate MultiMedia Notebook

- Mobile Intel® Pentium® III Processor at 1.2GHz-M featuring Intel® SpeedStep™ Technology
- 15" Ultra XGA TFT Display
- 256MB SDRAM at 133MHz
- 30GB[5] Ultra ATA Hard Drive
- Fixed Internal 8X Max DVD-ROM Drive
- 32MB DDR NVIDIA® GeForce2 Go® 4X AGP 3D® Video
- Sound Blaster® Compatible Sound with Wavetable
- 59WHr Li-Ion Battery with ExpressCharge™ Technology
- Internal 56K[6] Fax Modem
- MS® Windows® XP Home Edition, MS® Works Suite 2001
- 1-Yr Limited Warranty,[2] 1-Yr Mail-In Service
- 6 Months of American Online™ Membership Included[7]

$2249 Ask us about no payments for 90 days for qualified customers.
E-VALUE Code: 00501-801222m

Recommended upgrades:

- 2nd Bay 8X CD-RW Drive, add $179
- Intel® Pentium® III Processor at 1.2GHz, add $149
- 3-Yr Limited Warranty,[2] 3-Yr Mail-In Service, 3-Yr 24x7 Phone Support, add $119

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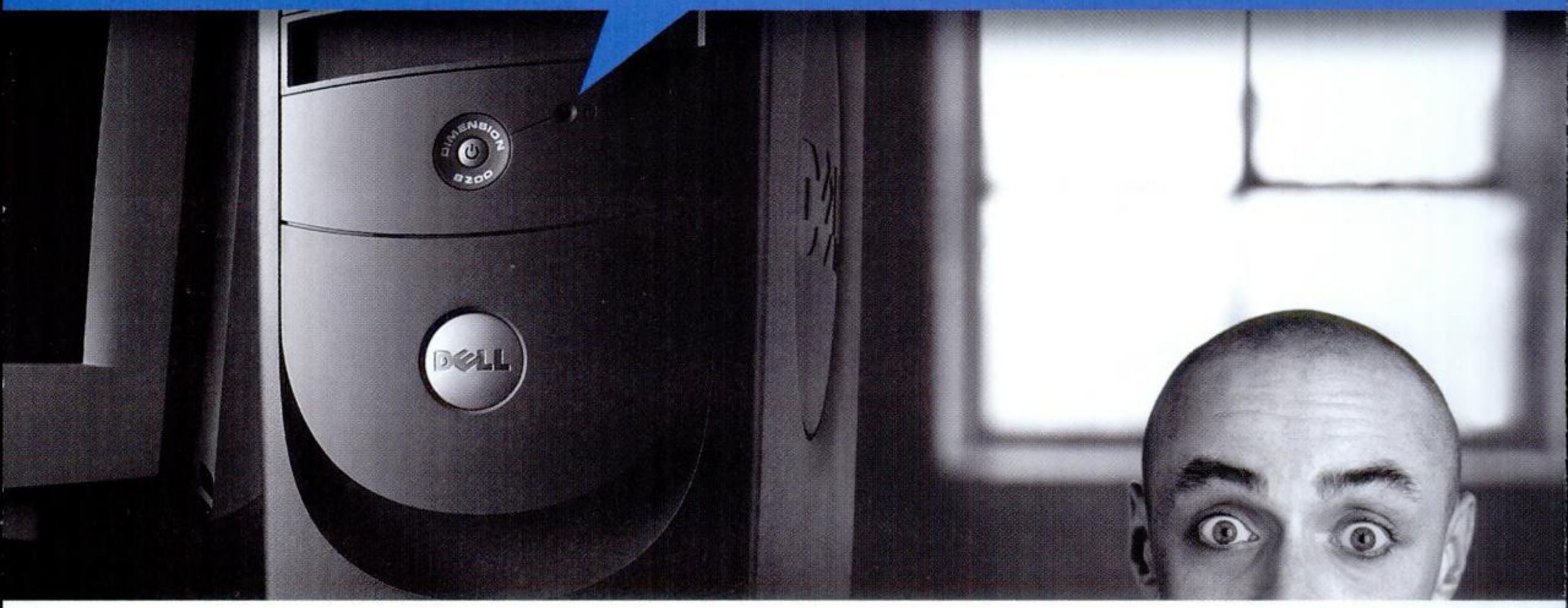
I've got 2.0GHz.
I run circles around speeding bullets.



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Dimension™ 8200 Desktop

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- 16X/10X/40X CD-RW Drive with Roxio's Easy CD Creator®
- SB Live! 1024V Digital Sound Card
- Harman Kardon® HK-695 Surround Sound Speakers with Subwoofer
- 56K[6] PCI Telephony Modem for Windows®
- 10/100 PCI Fast Ethernet Network Card
- MS® Windows® XP Home Edition, MS® Works Suite
- 1-Yr Limited Warranty,[2] 1-Yr At-Home Service,[4] 1-Yr 24x7 Phone Support
- 6 Months of America Online™ Membership Included[7]

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E-VALUE Code: 00500-501218

Recommended upgrades:

- 80GB[5] Ultra ATA/100 Hard Drive (7200 RPM), add $70
- Turtle Beach® Santa Cruz™ DSP Sound Card, add $40
- 3-Yr Limited Warranty,[2] 3-Yr At-Home Service,[4] Lifetime 24x7 Phone Support, add $139

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